ELECTRICAL SOUTH

Serving the 18 Southern

This month's features: "How wholesalers serve the electrical trade."

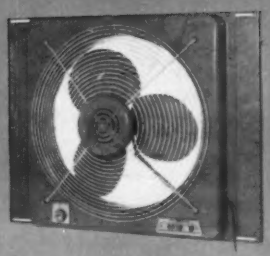
JANUARY 1958

Air Berns King

NEW LOW PRICES! SAME HIGH QUALITY!

NEW! Promotionally Priced
20" FAN-MOBILE List, only **$49.95**

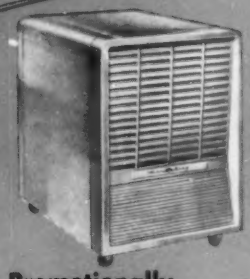
Now every one of your customers can afford wonderful Fan-Mobile cooling convenience at this new low cost. Full 180° tilt adjustment . . . easy height adjustment. 3 speed control, non-marking rubber wheels, safety snap-out grills, handsome beigetone finish. Model EM20.



20" Electrically Reversible Window Fan with Automatic Thermostat Control List, only **$49.95**

An exceptional fan value—with every feature your customers want. Thermostat turns fan on and off automatically to maintain temperature selected. Has 3 speed push button controls, safety grill. Wafer-thin styling mounts practically flush with window. Model SQ20PB.

20" 2 Speed Rotary Switch Model—Same as the above model without thermostat or push buttons. One simple control gives choice of speeds and easy reversing. Model SQ20E, List price **$39.95**



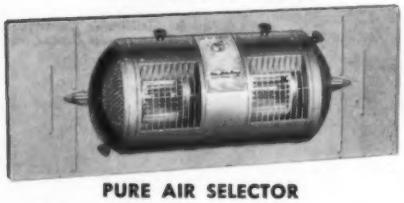
NEW! Promotionally Priced Electric DEHUMIDIFIER with 1/5 H.P. Compressor
List, only **$99.95**

Even the budget minded can afford complete moisture protection with this new Economy Dehumidifier. Dehumidifies an average enclosed area up to 12,000 cubic feet. Permanently oiled, hermetically sealed. Removable water container, all steel cabinet and grill, swivel type casters for easy portability. Model DH20.

Deluxe Dehumidifier with Automatic Humidistat

Humidistat turns unit on automatically if humidity rises above danger level . . . turns unit off when humidity drops. Beautifully styled and finished.
Model DH10N . . . . . List price **$139.95**

A COMPLETELY NEW CONCEPT IN WINDOW FANS



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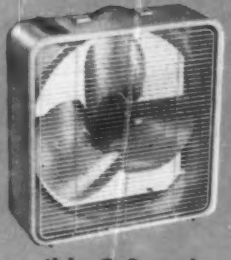
- **Draws Out Stale Air**
- **Does Both at The Same Time**
- **Re-Circulates Room Air**

PLUS Filters the Air Clean of Dirt—Dust—Lint and Pollen During All 4 Operations!

There's never been anything like it—at any price! Has powerful twin blower wheels, 3 speeds, controlled direction of air flow, removable all-metal filters. Takes about half the space of an ordinary window fan. Can be used both summer and winter because there's no back draft. Complete with adjustable side panels.
Model 2838 . . . . . List price **$49.95**



20" Reversible 3 Speed All-Purpose Fan List, only **$39.95**

The ultimate in popularity in a household fan! Use as a window fan—table fan—floor fan—in any room. Stands on own rubber feet. Can be used for intake and exhaust. Safety snap-out grills, convenient carrying handle, attractive beigetone finish.
Adjustable side panels and swivel stand optional. Model RA20.
14" Model same as above. Comes complete with mounting bar for use with casement windows, if desired.
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20" Electrically Reversible With Automatic Thermostat Control

Has all the above features plus automatic thermostat. Reverses at the turn of a switch.
Model 20R . . . . . List price **$49.95**

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Volume 38 **Number 1**

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W. J. Milner
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ELECTRICAL SOUTH

SERVING THE 18 SOUTHERN AND SOUTHWESTERN STATES

January, 1958 — **Vol. 38—No. 1**

In this issue

Utility engineers' forum

In every issue

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Economic comment

by J. Whitney Bunting, Ph.D.

Contributing Economics Editor

A look ahead

This is the season of the year when all experts (or pseudo-experts) look dreamily into the future and attempt to foresee what can happen in the economic world of the coming year. Normally it is a time to add up the various positive and negative economic influences, weigh them according to their assumed influence, and then draw conclusions as to the upward or downward potential of economic activity.

Unfortunately it can not be that simple this year, and proper care must be given to many influences that are not purely economic in character. Rather there are many factors of a non-economic nature that could well spell the difference between economic prosperity and a *mild* recession. The worst that might happen as things appear at this moment would be a mild recession as has been underlined above.

Opportunities for economic advance are still as bright as at the advent of 1957. During a year which had many economic occurrences, the nation was able to achieve what may prove to be one of the best years on record. Earnings reports from most major companies as the year closes bear out this view.

Probably the most questionable factor that arose during 1957 was the erratic movement of the stock market. Even though prices of securities in general still hold at a comparatively high level, there is a decided "soft" tone to the market that hints of a further decline during the early months of 1958.

Such a decline if it should occur, will probably be held to a period of short duration. In March and April, the season for many of the annual meetings of major companies, there will be many heartening reports dealing with the strengths found in 1957 and the excellent continuing opportunities for profit in 1958.

Thus, the market will probably react favorably and push to new "highs" during the middle of next year. Such a condition will give new heart to those who deal in economic matters.

Bright factors

Two of the main factors that have contributed measurably to economic progress and prosperity from the end of World War II to the present will still be forceful factors well into the foreseeable future. These factors show no signs, at present, of any major change.

The first of these, of course, is defense spending. Some months ago, the government began an economy wave that threatened to undermine the entire defense program. The cancellation of some of the major defense contracts seemed to portend a decided drop in industrial activity and in research and development.

However, the successful orbiting of the two Sputniks by the Soviet government caused a direct and immediate reversal of defense money saving so that the present expectation is for more and more expenditures particularly in the areas of missile development.

It should be made quite clear that such defense expenditures do not create high profits for the companies that are awarded contracts, for most of them are negotiated with a profit figure that falls far short of the return earned by normal corporate investment.

Employment levels

However, they do keep men at work and payrolls at a high level thus contributing to the general purchasing power of the American consumer. It is essential that this purchasing power be maintained if the economy is to continue at present high levels.

The second bright factor is one that is often mentioned in this column as indispensable for a continuation of business good times. This is the continuation of consumer ability to buy and *willingness to buy*. There appears to be no decline in sight as far as consumer purchasing power is concerned.

In fact, in spite of some strong statements in favor of a "hold the line" policy relative to wages and salaries, some increase in consumer incomes may be anticipated. Such increase next year may be limited and spotty, but should be sufficient to maintain consumer enthusiasm in the market place.

Apparently the consumers are also willing to buy a whole host of products as the year 1958 opens. During 1957 there were some cutbacks in spending for consumer durables such as appliances, television, and automobiles. Manufacturers, however, anticipate that there should be an upsurge in such sales during the coming year and are confidently setting plans for strong production.

All in all, the year 1958 looks good from present early indications.

Dr. Bunting is a well-known economist and educator having special knowledge of the South.

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Require only seconds

to relamp or convert!

One trip up the ladder, a few quick twists of the wrist, and relamping or wattage conversion is done! V-51 reflectors with integral neoprene ring adapt perfectly to the grooved unilet... permit instantaneous substitution of reflectors.

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For economical service and maintenance, it's hard to find anything more practical than Appleton's V-51 Series exclusive unit assembly (adapter, receptacle, globe, and guard). Shock absorbing socket cuts lamp replacement costs. Try the Appleton V-51 Series standard or shallow dome, deep bowl, or angle type reflectors and 100 W and 150/200 W vaportight unit assemblies in your plant today. Available in a variety of hub sizes in pendent, ceiling, or bracket type fixtures for every kind of installation.

Maintenance man takes spare assembly to lamp requiring replacement or wattage change... removes lamp assembly ... screws fresh unit in place and the job is done! Higher wattages of 150/200 are interchangeable with 100 watt unit and can be used in same unilet body. (Die-cast aluminum guard turns counter clockwise to act as a tool for easy removal in relamping).

An upward thrust and slight quarter twist engages neoprene ring with the groove in the unilet and snaps the reflector in position. Entire operation of removing lamp, inserting new unilet, and positioning of reflector requires no special tools... no set screws... no small parts to juggle. Absolute simplicity!

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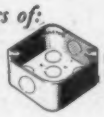
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New Dayton Daily News Building Gets Life-time Wiring Protection With

YOUNGSTOWN "BUCKEYE" STEEL CONDUIT

Electrical wiring system in the new Dayton Daily News Building will be permanently safe from damaging elements such as water, moisture, vapor, dust and dirt because Youngstown's Full Weight Rigid Steel "Buckeye Conduit is on the job 24 hours a day—every day.

If the safe and efficient operation of your electrcial systems—in any location— poses a problem, then Youngstown "Buckeye" Conduit should be your specification. Field reports relate: "It's easier to bend and thread—easier to fish wires through and because of its superior corrosion resistance, provides a much longer, trouble-free service life."

Remember, because Youngstown is the only producer of rigid steel conduit controlling all processes from ore mining to finish threading, you can be certain each length contains the same high quality that has made it the accepted standard of leading owners, architects and contractors everywhere.

Our Distributor's complete and ample stocks will help keep your jobs on schedule—and cover emergency needs whenever they arise. Why not call today for prompt and efficient handling of your next conduit order.

Dayton Daily News Building, Dayton, Ohio
Design and construction by The Austin Company, Cleveland, Ohio
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Standard-threaded rigid steel conduit is the only wiring system approved today by the National Electrical Code as moisture-, vapor-, dust- and explosion-proof for use in hazardous locations and occupancies.

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Aluminum & Bronze Power Connectors • Clamps • Fittings • Accessories for SUBSTATIONS • TRANSMISSION • DISTRIBUTION

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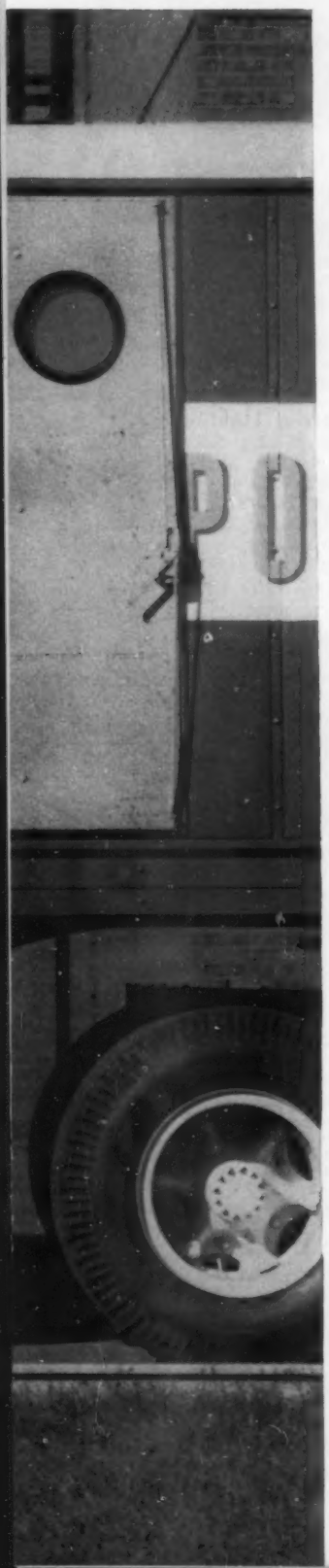
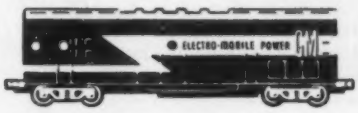


The Diesel engine was first designed and built for mechanical drive. It was much later that Electro-Motive incorporated this principle in designing and building a prime mover specifically for electric power generation.

It was, in fact, in 1932 that two experimental electric power generating sets were tested at the Chicago Century of Progress Exposition. These two cycle engines were a revelation in design —compact and lightweight.

Refined and improved over the years, this advanced prime mover has been produced in quantity by Electro-Motive—enough, in fact, for a total generating capacity of more than 24,000,000 kw. Above all, this engine has proved its dependability, operating for thousands of hours under every conceivable condition with only the most routine type of servicing.

It is this wealth of tested and proven experience that is your best assurance when you install Electro-Mobile equipment. Why not discuss its potential for low load factor generation with your Electro-Motive representative?



1000 kw units for use on sidings or placed on piers for semi-permanent use.

500 kw units offer excellent mobility for many temporary applications.

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CATALOGS and BULLETINS

Available Free to Readers of Electrical South upon Request

1011—Electrical Conduits

"Natural Electric Conduits" is the title of the 30-page Catalog No. 603 which describes and illustrates the many types of electrical conduits that are manufactured by National Electric Products Corp., 2 Gateway Center, Pittsburgh 22, Pa.

1015—Squeezon Connectors

The Squeezon, a new compression connector for power lines, is fully described in bulletin "SQ" available from the James R. Kearney Corp., 4236 Clayton Ave., St. Louis 10, Mo. The Squeezon features greatly increased electrical and mechanical efficiency.

1019—Service Panels

Information on protective electrical control centers for homes, apartment buildings, service stations, and industrial applications is contained in Bulletin PM-385, "BullDog Pushmatic Electric-Centers," issued by BullDog Electric Products Co., 7610 Jos Campau, Detroit, Mich.

1071—Plugs and Receptacles

Additional loose-leaf sheets for insertion in the Pylet Catalog 1100 are available from the Pyle-National Co., 1354 N. Kostner Ave., Chicago 51, Ill. These pages describe a wide range of plugs and receptacles for special purposes.

1085—Lighting Fixtures

Eastern presents their most complete catalog, 32 pages of engineered lighting data, including a variety of fixtures for all architectural, commercial and industrial applications. Eastern Fixture Co., Inc., 170 Vernon St., Boston 20, Mass.

1087—Fittings Catalog

The M. & W. Electric Mfg. Co., Inc., East Palestine, Ohio, has available their new 28-page catalog 53, covering Service Entrance Mast Fittings, Service Entrance Cable Fittings, Ground Clamps, Rods, BX and Romex Connectors, Conduit Fittings, Wireholders, Insulators Supports and Cable Racks.

1097—Cord Catalog

A complete 48-page catalog is available from the Cornish Wire Co., 50 Church St., New York 7, N. Y. containing all data on flexible and portable cords, lamp cords, heater cords, cordsets, radio and electronic wires.

1099—Lighting Fixtures

Fluorescent and incandescent luminaires for schools, offices, stores and factories are illustrated in a series of bulletins issued by Curtis Lighting, Inc., 6134 West 65th St., Chicago 38, Ill. The entire series or any individual bulletins may be obtained upon request.

1103—Compression Connectors

Burndy's new Bulletin CR-1A features the new Crimpit technique for all overhead distribution connections. The bulletin provides information on the entire Cripit line, including details of hydraulic installation tooling and accessories. Copy available from Burndy Engineering Co., Inc., Norwalk, Conn.

1109—Anchoring Devices

An illustrated 32-page catalog, No. 65, describing more than 25 anchoring and drilling devices for making fastenings to masonry, is available from the Arro Expansion Bolt Co., Marion, Ohio.

1135—Wiring Devices

Catalog No. 51, containing complete electrical wiring device line of Leviton Mfg. Co., Brooklyn 22, N. Y. is a 96-page thoroughly illustrated one. Included are such features as the Kwik-Change line, with wiring diagrams, a general index, and an index to catalog numbers.

1155—Wire and Cable

Two catalogs—Bulletin RS-5, and Power and Control Cables, No. 24—available from Rome Cable Corp., Rome, N. Y. Power and Control Cables catalog is intended for utility, construction, and industrial engineering and purchasing personnel as a guide in selection of proper wire and cable types.

1167—Industrial Lighting

A four-page catalog insert is now available from the Multi Electric Mfg. Co., Inc., 4223-43 West Lake St., Chicago 24, Ill. The leaflet describes Multi's line of lighting equipment and wiring devices, which include floodlights, vaporproof fixtures, and fluorescent and incandescent fixtures.

1195—Kitchen Ventilation

Descriptive eight - page folder, Bulletin 620H, showing typical installations of all models in the Clipper line of ventilators is available from Trade-Wind Motorfans, Inc., 7755 Paramount Blvd., Rivera, Calif. Folder includes dimensional drawings of installations helpful to building and electrical contractors.

1197—Convenience Outlets

Four-page bulletin gives complete information on the new P&S No. 500 for adding extra outlets to existing installations. Everything you need in a single package—on steel boxes required. Available from Pass & Seymour, Inc., Dept. ES, Syracuse 9, N. Y.

ELECTRICAL SOUTH
806 Peachtree St., NE
Atlanta 8, Ga.

Jan., 1958

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Please send me the bulletins and catalogs indicated.

(Print Plainly)

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Company .....

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1087	1097	1099	1103	1109
1135	1155	1167	1195	1197
1209	1211	1219	1223	1227
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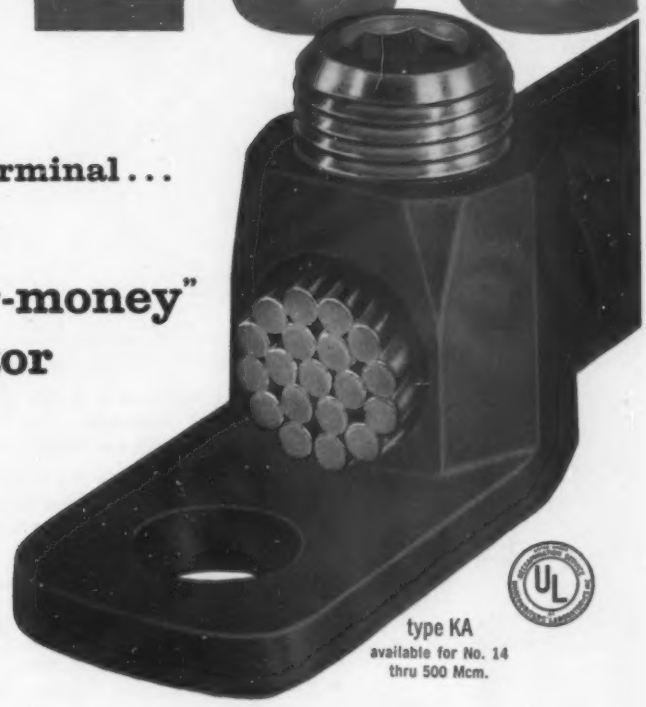
KA-LUG

new quality in a low-cost terminal . . .

the NEW "most-for-your-money" connector



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Enter Code Numbers of Catalogs Desired on Coupon on Page 10

1209—Fluorescent Ballasts

Advance Transformer Co., 2950 N. Western Ave., Chicago 18, Ill., has recently completed the compilation and printing of a 20-page catalog on fluorescent ballasts and their use. Included are data sheets on available Advance ballasts and a comprehensive installation and operation section and testing procedures. Copies of the booklet are available on request.

1211—Fluorescent Fixtures

Catalog folder No. 911, "Peerlite by Guth," has been announced by the Edwin F. Guth Co., 2615 Washington Blvd., St. Louis 3, Mo. Copies of this new eight-page booklet are available from the company upon request. The booklet is designed for the lighting specialist, giving complete engineering data and dimensions.

1219—Electrical Enclosures

Catalog No. 5354-U is a 66-page catalog describing the complete line of steel and aluminum electrical enclosures manufactured for utility use by the B & C Metal Stamping Co., 590 Means St., N. W., Atlanta, Ga. The catalog is well illustrated and contains complete specifications as well as prices on all items in the B & C line.

1223—Circuit Protection

A 24-page illustrated handbook contains suggestions for selecting the right kind of protection for electric circuits, motors, appliances and apparatus. Includes motor wiring diagrams and a complete list showing proper size fuses to use. Available from Bussman Mfg. Co., University at Jefferson, St. Louis 7, Mo.

1227—Conduit Fittings

A new complete 4-page catalog illustrating their complete line of conduit fittings and lighting parts for the electrical wholesaler has been made available by Elliott Electric Products Co., 1513 Olmstead Ave., New York 62, N. Y.

1229—Switch and Outlet Boxes

A new RACO General Catalog is now available listing detailed information on boxes, covers, and bar hangers. The catalog includes data on numbers of wires permitted per box and a list of comparative catalog numbers. Copy available from All-Steel Equipment, Inc., Aurora, Ill.

1231—Conduit

A handy, pocket-size booklet illustrating and describing four ways to greater conduit efficiency and lower installation costs has been published by Youngstown Sheet and Tube Co., Youngstown, Ohio.

Enter Code Numbers of Catalogs Desired on Coupon on Page 10

1233—Troffer Catalog

A 36-page catalog, with complete information on their newly re-designed architectural troffers has been released by Smithcraft Lighting Division, Chelsea, Mass. Divided into sections for selection of lighting units, the catalog gives complete illustrations and data for 1 and 2 foot troffers in all types of ceiling construction. Also included in the catalog is information on ceiling lighting patterns, shielding designs, lighting techniques and applications.

1237—Wireholders

Knox Porcelain Corporation, Knoxville 1, Tenn. has recently redesigned a one-piece metal base style reinforced wireholder, No. 5009. Base and screw are hot dipped galvanized. This wireholder has extra sharp threads and quick starting point to make driving easy. KNOX manufactures a complete line of Porcelain Wireholders, House Brackets, and other Secondary Service Materials.

1239—Heavy and Light Duty Power Derricks

J. H. Holan Corp., 4100 W. 150th St., Cleveland 11, Ohio has available a 4-page catalog on the Series 4700 Power Derrick—a light-duty derrick that lifts loads to 6500 pounds, poles to 55 ft. They also have available a catalog on 3700 Power Derrick containing data on derricks for lifting poles up to 75 feet long and loads up to 12,000 pounds.

1241—Fans

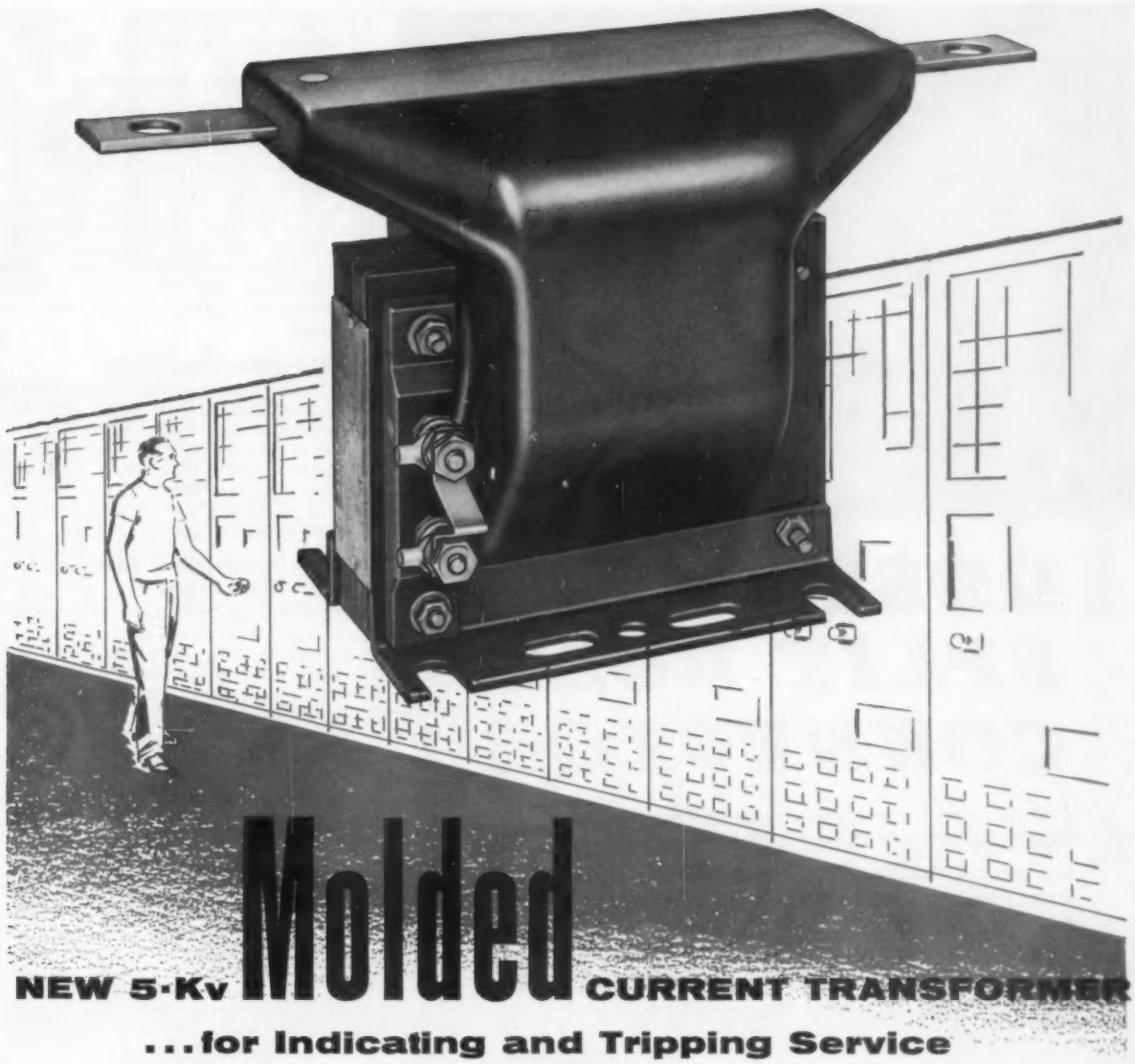
A convenient file folder covering attic and industrial ventilating fans, up to 108" diameter, is available upon request from American Coolair Corporation, Box 2300, Jacksonville 3, Florida. The attractively illustrated catalog pages are bound into the folder, which is available with or without list price sheets.

1245—Exhaust Fans

Two new two-color illustrated four-page catalogs (Bulletin Nos. 6414 & 6514) describing the new Model G Ventura fans for business and commercial exhaust applications and Model K for industrial heavy-duty exhaust applications are now available from American Blower Corp., Detroit 32, Mich.

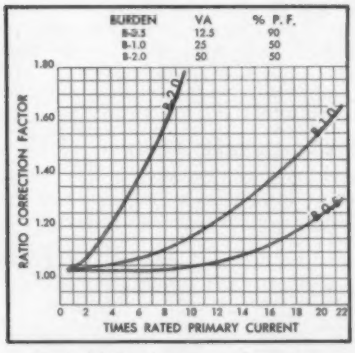
1251—Radiant Heating Cables

Three folders, describing Ceilheat's three types of radiant cables, are now available from Ceilheat, Inc., 5212 Homberg Dr., Knoxville, Tenn. One folder features the Aristocrat radiant cable for plastered ceilings, another describes Ajax radiant cable for concrete floors, and the third describes Dri-Cell radiant cable for dry-wall construction.



NEW 5-Kv Molded CURRENT TRANSFORMER

...for Indicating and Tripping Service



Typical 60-cycle overcurrent curves for Type LRM current transformer.

Extends Line of Maintenance-free Epoxy-resin Units

Latest in a growing family of molded units, this Type LRM current transformer rated 5 kv is already a prime favorite with panel and switchgear designers. Molded of epoxy resin, this new transformer is virtually maintenance-free. It has high impact strength . . . resists mechanical forces, moisture and fire. These advantages at no extra cost.

All units are supplied with a short-circuiting strap, removable after installation. Base design permits mounting anywhere—on walls, bars, channels, etc.

Allis-Chalmers instrument transformers are available in the widest possible rating range. Many are molded units. Other epoxy-resin designs are in pilot production. For complete information, see your A-C representative, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-5503

Enter Code Numbers of Catalogs Desired on Coupon on Page 10

1253—Power Connectors

A completely new catalog (No. 526) of power connectors and bus support clamps is now available from Southern States Equipment Corp., Hampton, Ga., superseding catalog No. 525-F. Furnished in a handsome 7-ring binder, the new catalog includes sections on bus support clamps, couplers and angle braces, bar connectors, Tee connectors, stud connectors, ground connectors, parallel clamps, and terminals.

1255—Electrical Tools

Tools for electrical construction, such as Hydraulic Benders, Hydraulic Pipe Pushers, Knockout Punches and Hydraulic Drivers, Cable Pullers, Screw Anchor Expanders, Pipe-Size Bits, etc., are shown in Catalog No. 35-E, published by Greenlee Tool Co., 2136 Twelfth Street, Rockford, Ill.

1257—Centrifugal Roof Ventilators

An 8-page, two-color folder (SDA-220) giving construction features, performance data, dimensions and recommended specifications for the new Centrifugal Roof Ventilator manufactured by The Peerless Electric Company, Warren, Ohio. Other important Peerless Fan and Blower products and a list of Peerless sales representatives are also included.

1259—Electrical Tapes

Twelve pages of specifications and application data make up an attractive booklet on Dutch Brand Electrical Tapes. Plastic, friction, and rubber tapes, as well as a vinyl tape made in nine different colors, are available from Dutch Brand Division, Johns-Manville, 7800 So. Woodlawn Ave., Chicago 19, Ill.

1261—Cable Puller

The electrically powered cable puller manufactured by The Barth Corp., 12650 Brookpart Rd., Cleveland 30, Ohio, is described in a new booklet. This tool is ideal for industrial and commercial construction and maintenance.

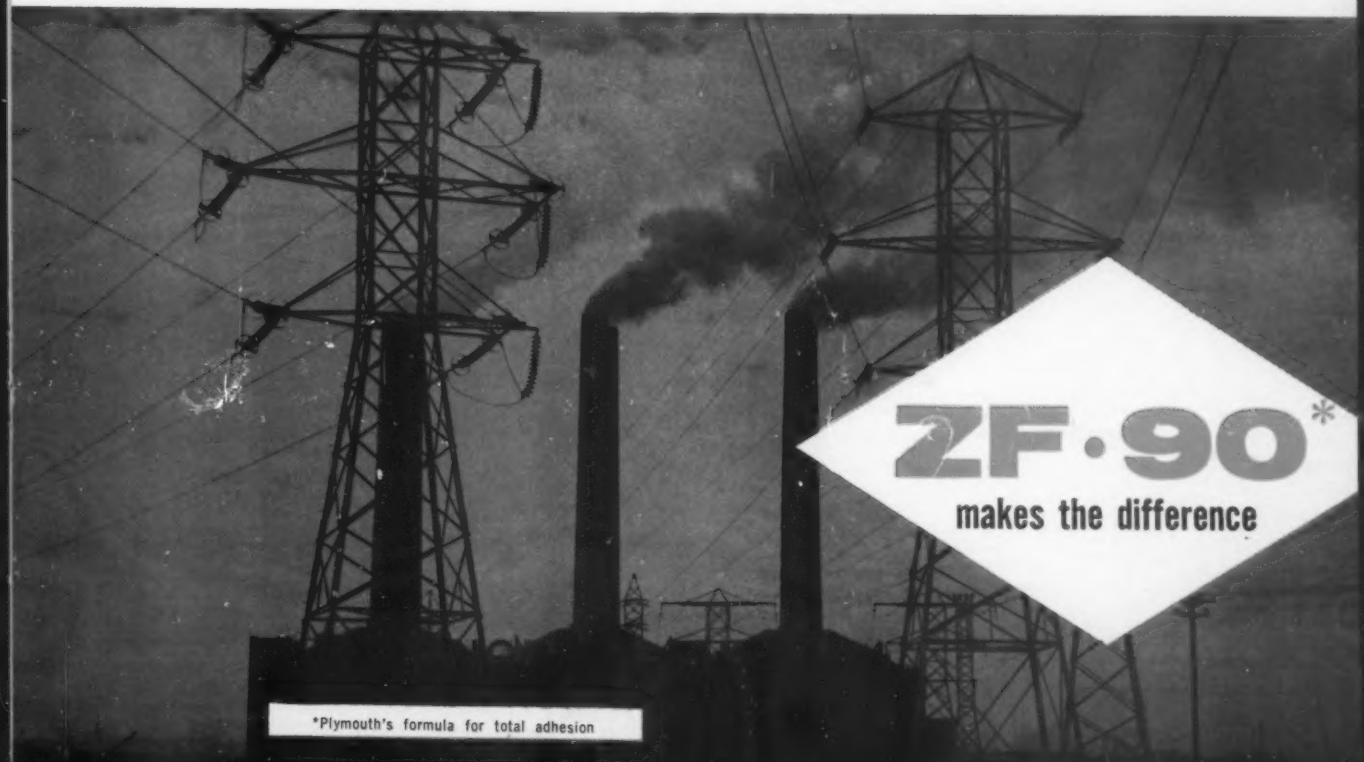
1263—Conduit Fittings

Bridgeport Fittings, Inc., 209 Center St., Bridgeport, Conn., offers a twenty-six page catalog describing their line of conduit, bushings, lock nuts, couplings, nipples, supports, connectors, and other fittings. Size, weight, and packaging details are included.

1265—Wire and Cable

Simplex Wire & Cable Co. announces a new catalogue of the family of ANHYDREX insulated cables. Catalogue No. 1028, which supersedes Nos. 1017 and 1018, is available on request from Simplex Wire & Cable Co., 79 Sidney Street, Cambridge 39, Mass.

NEVER BEFORE A PLASTIC TAPE LIKE THIS →



GET TOTAL

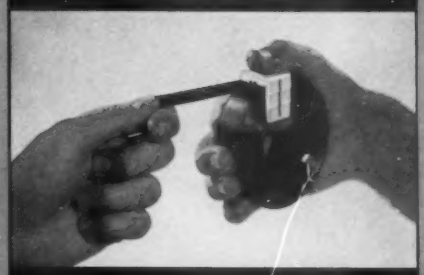
new SLIPKNOT #7 ...inseparable fusion

A COST-CUTTER PACKED IN EVERY CAN!

QUICK, CLEAN CUTS WITH THE NEW SLIPKNOT PLASTIC CUTTER

NOW . . . a new, exclusive, (pat. pending) tape cutter, developed by Plymouth for sure, easy cutting, is packed FREE* in every 66-ft. can . . . to cut without waste, even in the tightest spots! Plastic, non-conducting.

NO MORE OF THIS!



NOW – CUT CLEAN, QUICKLY!

ALWAYS HANDY – PACKS IN CORE!

*Limited time offer

TAPES BY
SOLD ONLY THRU RECOGNIZED WHOLESALERS
PLYMOUTH RUBBER COMPANY, INC.

ADHESION

PLASTIC TAPE with ZF-90* for permanent protection

AT LAST . . . a vinyl electrical tape you *know* you can depend on! New SLIPKNOT #7 is superior to any plastic tape you've ever known!

ZF-90* *inseparably fuses* special adhesive to vinyl base; they *cannot come apart*, and therefore *will not dry out. This* is *total adhesion*, making splicing easier, swifter, surer than ever before!

Thus Plymouth creative research has developed a plastic tape that will, with only moderate tension, pull down tightly and hold permanently on *every* job, without creeping or thinning, untroubled by field conditions under which ordinary plastic tapes often fail.

New SLIPKNOT #7 has a wider temperature working range, too, than other plastic tapes. ZF-90* makes the difference. This new tape has successfully passed the most rugged laboratory and field tests ever devised. It will pass all of yours, too.

New SLIPKNOT #7 is tough — abrasion-resistant, yet resilient and easy to handle, *molding totally* around any job. It *permanently* resists the attack of water, acids, alkalies, oils and corrosion. And just *one* .007" layer has a dielectric strength of 10,000 volts!

Why settle for partial protection when you can get *total adhesion* with new SLIPKNOT #7 PLASTIC ELECTRICAL TAPE? Don't wait another day to try it. It's at your distributor's now.

*Plymouth's formula for total adhesion

Temperature, 94°. Humidity, 99%. Electrical conditions — just about the worst in the world! New Slipknot Plastic Tape went to the offshore oil fields of Dutch Guiana — and it's still there, on the job through salt, heat and wet that never let up!

Years of punishment ahead! New slipknot Plastic Tape splices the original wiring in the 'tween decks of an ocean-going tanker, where salt water and oil will do their worst work! New Slipknot proves its worth on all jobs!

How dry and gritty can you get? New Slipknot Plastic Tape goes to work in the high desert country where the winds blow constantly! (In wider form, wraps pipelines — its anti-corrosion and abrasion-resistant properties are excellent!)

PLYMOUTH RUBBER COMPANY, INC.

Makers of SLIPKNOT FRICTION TAPE

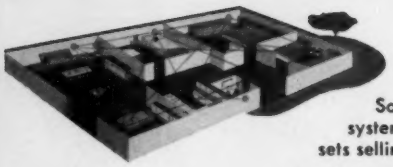
DIVISION 15 **CANTON, MASSACHUSETTS**

turn up your sales volume with the new

progress

Sound Guard®

a complete radio and communications system for the home



Looking for "plus" business? Once again, Progress brings you a big, new, profitable market with Sound Guard radio-intercom systems.

Sound Guard is a *quality* radio-intercom system with features formerly found only in sets selling for many times its price.

Sound Guard helps you sell the builder a "package" deal for his new houses. It's a tremendous "added feature" at an amazingly low price.

Sound Guard helps you sell the electrical contractor. Let him put a Sound Guard radio-intercom into the next sample house he wires and just see the orders come in for this outstanding "extra."

Sound Guard helps you sell the homeowner . . . as a "baby-sitter," a safety feature against unwelcome intruders, a source of music and entertainment throughout the home, a built-in "watch-dog" a step-saver, and many other features.

The PROGRESS SOUND GUARD complete set consists of: one Master Station • three Indoor Remote Stations • one Outdoor Remote Station • 150' of 4-conductor wire, 50' of 2-conductor wire and all necessary hardware and mounting brackets. *(Extra Remote Stations are available at small extra cost.)*

MASTER STATION

- Large Vernier Radio Tuning Dial
- Six Position Selector Switch
- Radio Volume Control
- Inter-com Volume Control
- Phone Jack

- Station Switches
- Telechron Lullaby Clock *(optional)*
- Timer Outlet
- Combination Speaker-Microphone
- Pilot Light for "in use" signal

INDOOR REMOTE STATION

- Volume Control
- Privacy "Off" Switch
- Normal "Norm" Listening Switch
- Monitor "Mon" Switch
- Talk Switch
- Combination Speaker-Microphone
- Oyster White Matte Finish

OUTDOOR REMOTE STATION

- Pushbutton for chime or bell
- Combination Speaker-Microphone
- Neoprene Gasket
- Solid Brass

PROGRESS MANUFACTURING CO., INC.

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Please send me literature on Progress Sound Guard Radio and Communications System for the home.

Name_____

Company_____

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Easier, safer, more gracious living with SOUND GUARD

SAVES TIME AND STEPS

Sound Guard provides "spur-of-the-moment" two-way communication between any two locations. From any Remote you can

CALL ANY ROOM IN THE HOUSE

BUILT-IN BABY SITTER

Sound-Guard's ultra-sensitive speaker monitors child's or invalid's room from any room desired — day or night.

ENJOY MUSIC IN ANY ROOM

Sound-Guard's Radio and built-in phono jack brings your favorite programs to any one or combination of rooms in the home.

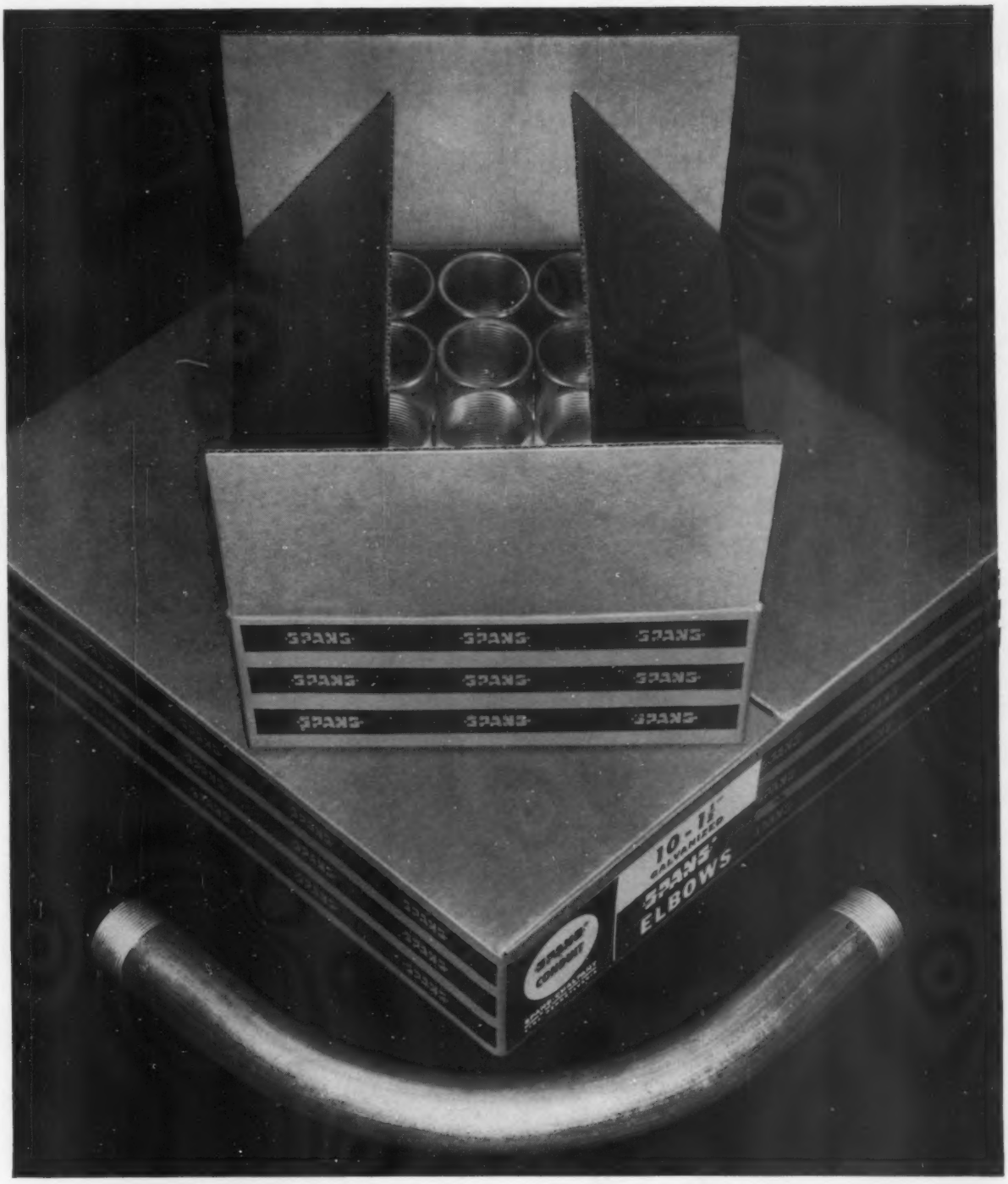
ANSWERS FRONT DOOR

Sound-Guard gives you the assurance of knowing who is at the front door before opening it.

ONE YEAR WARRANTY

Progress Manufacturing Co., Inc.

CASTOR AVENUE & TULIP STREET, PHILA. 34, PA.



Your shipments of SPANG Conduit Couplings and Elbows now come in these newly-designed blue-striped cartons. Why the change? The high visibility of the new cartons and labels make it easier for you to spot them in a hurry, easier to pick out of stock what you need when you need it, easier to inventory. Inside—the same *top-quality* SPANG Couplings and Elbows you've been using right along. Your nearby SPANG Distributor carries the complete line of SPANG Couplings and Elbows in the new cartons . . . and SPANG Conduit and SPANGLEAM EMT, too. He'll give you *top-quality* service. Give him a call.

SPANG® CONDUIT

SPANG-CHALFANT

Division of The National Supply Company

GENERAL SALES OFFICE:

TWO GATEWAY CENTER, PITTSBURGH, PA.

District Offices and Sales Representatives in Principal Cities

beautiful from the OUTSIDE...

...even *Greater Beauty* when you step inside!

The beauty of a Benjamin Panel-Glo lighting system cannot be confined. It comes right through to the outside! It supplements today's slickest store fronts to attract even more traffic and beckon even more potential customers to "come on in." On the inside, Panel-Glo's gently-diffused, shadow-free, high-level lighting stimulates a greater desire to buy. Gone is the forest of lighting fixtures, ugly ducts, pipes, beams and other ceiling irregularities. Panel-Glo conceals them all, to create a magnificent ceiling of light . . . at lower-than-ever cost! Send for Panel-Glo Facts Bulletin. Benjamin Electric Mfg. Co., Dept. Z-1, Des Plaines, Ill.

PANEL-GLO TRANSLUCENT LIGHTING SYSTEMS

BENJAMIN

...always the source of good lighting

Now Setting the Pace in COMMERCIAL LIGHTING

ONE SOURCE FOR EVERY INDUSTRIAL LIGHTING NEED

RACO

You Can Always Rely On RACO

ADJUSTABLE BARS

✓ **QUICKLY POSITIONED**

✓ **EASILY INSTALLED**

✓ **SAVES TIME**

NEW STOP-LOCK

Prevents bar from slipping apart accidentally. Permits separation of bar if desired.

SELF-GAUGING

SHALLOW OFFSET

Place gauging lug against edge of rafter or joist and nail in place.

DEEP OFFSET

Straighten gauging lug and line up flush with edge of rafter or joist.

SERRATED NAILS ARE PRE-ASSEMBLED TO THE BAR

Ready for immediate installation.
No hunting for nails.

✓ **EXTRA STRONG**

THE ONLY BAR ON THE MARKET WITH RIGID "M"* CONSTRUCTION

RACO Adjustable Bars have been vastly improved. Note these extra advantages . . . pre-assembled serrated nails for easy installing . . . self-gauging lugs for fast positioning . . . friction stop-lock that prevents bars from accidentally slipping apart. High quality electro-galvanized finish. Write today for new bulletin describing these superior Raco Adjustable Bars.

ONLY 4 BARS DO THE WORK OF 16

Simplifies stock control . . . requires less investment in inventory. Two sizes fit most every job.

ASE RACO **ALL-STEEL EQUIPMENT INC.** Aurora, Illinois

ONE SOURCE FOR EVERY INDUSTRIAL LIGHTING NEED

SOLID NECK LINE Sturdy, attractive one-piece units provides quality illumination at low cost for **Factories** and **Warehouses.**

"FLO-LINER" Smartly styled shallow lighting units for any **Commercial** or **Office** installation.

"BI-FLO UPLIFTER" 72% downlight — 28% uplight, provides greater seeing comfort for industrial areas such as **Assembly Lines.**

"D" LINE High efficiency, all-purpose fixtures with upward component of light to relieve severe brightness contrast. Ideal for **Machine Shop** and **Factories.**

DURATACH LINE Rugged fixture that offers easy, low cost maintenance plus complete interchangeability. Widely used in **Industrial** and **Textile** plants.

"DUST-TIGHT" and **"VAPOR-TIGHT"** Specialized fixtures for hazardous and non-hazardous locations such as **Printing Plants, Flour Grain Mills, etc.**

and now Power-Lume

latest addition to *Wheeler*

"PACKAGE PLAN" lighting

Power-Lume by Wheeler — a new fixture in 2 types of Construction "F" and "V" . . . specifically designed to utilize fully the extra illuminating power of the new Power-Groove lamps. Delivers TWICE the amount of lumen output per foot of lamp length! For complete details, write for New Product Data Sheet No. 100 D.

Wheeler

REFLECTOR COMPANY

(Division of Franklin Research Corp.)

275 CONGRESS STREET

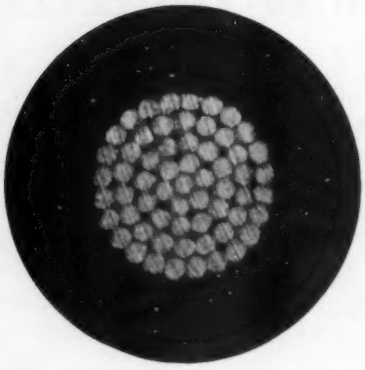
BOSTON 10, MASS.

Distributed Exclusively Through Electrical Wholesalers

The radically new, better way to make 15 KV BUTYL-INSULATED CABLE!

ROEBLING

VCV



NEW VERTICAL CONTINUOUS VULCANIZATION ASSURES CONCENTRIC INSULATION. THE RESULT IS UNIFORMLY HIGH DIELECTRIC STRENGTH AND IMPROVED CORONA LEVEL—THROUGHOUT THE LENGTH OF THE CABLE!

Unlike cable cured by other means, butyl-insulated high-voltage cable produced by Roebling's new Vertical Continuous Vulcanization method is never eccentric, abraided, flattened, scored, and its diameter never varies. Conductor is centered *through every inch of the cable.* What's more, the butyl insulation, even in "thick-wall" cables, is dense, free from internal blisters because every foot is cured at the same temperature and pressure. Controlled concentricity, plus uniform dense insulation, gives these cables their exceptional dielectric strength and corona level.

This is superior cable—we don't know how else to say it. For complete information write Electrical Wire Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING VCV 15KV CABLES are available in a complete range of strand constructions and insulation thicknesses—and with shielding, sheathing and other specifications that exactly meet your requirements.

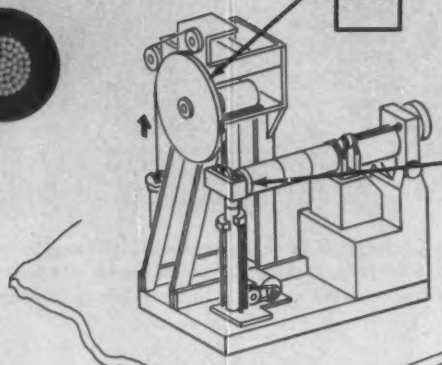
ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

Here's how ROEBLING VCV *works!*

2. Conductor is put under controlled tension, which is maintained during entire insulating process.

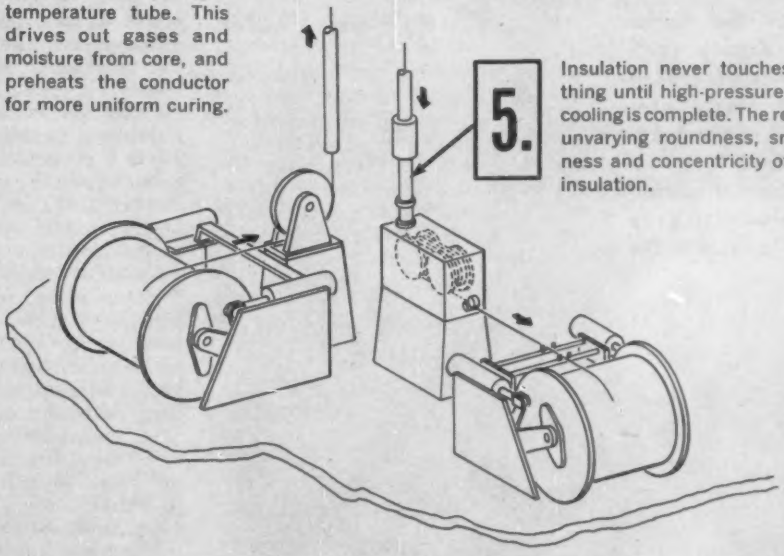
3. Butyl insulation is extruded downward around conductor.

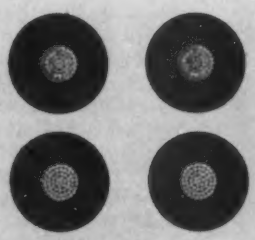


4. Vulcanization takes place continuously and uniformly in vertical tube. Constant high steam pressure assures dense, sound insulation.

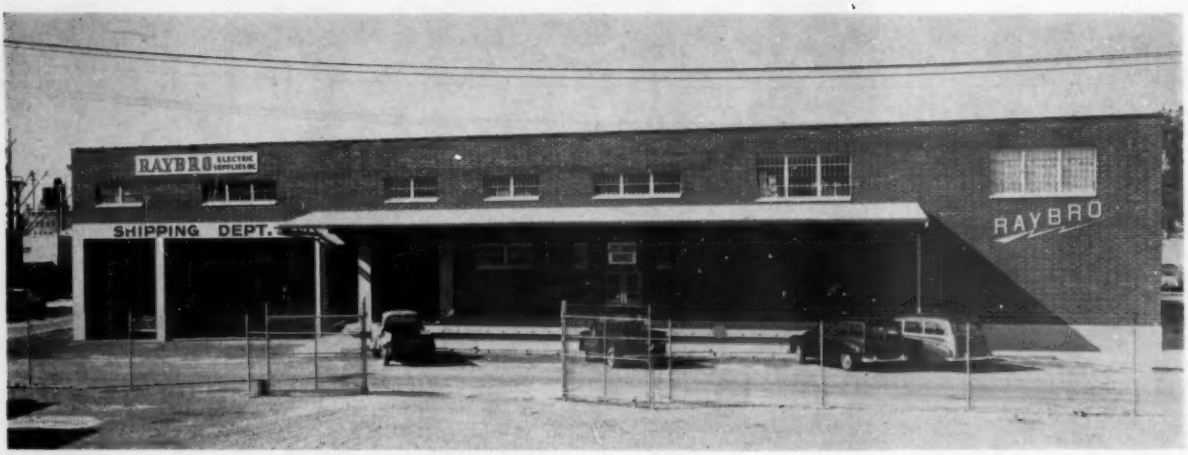
1. Strand wrapped in semi-conducting tape goes up through 4-story, high-temperature tube. This drives out gases and moisture from core, and preheats the conductor for more uniform curing.

5. Insulation never touches anything until high-pressure water cooling is complete. The result is unvarying roundness, smoothness and concentricity of butyl insulation.





These samples from a single conductor, 500 MCM cable with 42/64 insulation produced by Roebling VCV method were cut (left to right) at 10, 50, 500 and 1000 ft. intervals. Note how all sections have identical diameter and concentricity. Impartial utilities' experts who examined these samples say they've never seen anything to compare with them for uniformity, roundness, concentricity, smoothness and density of insulation.



Loading platform at Tampa Raybro permits contractors' vehicles to back right up for fast delivery. A door opens directly from the platform to the counter sales area. With ample stocks available from the wholesaler, there is scant need for the electrical contractor to keep his capital tied up in stock.

Wholesaler discourages loose

Tampa officers of this large Florida electrical supply company believe in strict adherence to a conservative credit program. The effect of overextending credit, they believe, is in contributing to the financial suicide of their customers—which in many cases comes to include the jobber, too.

By Harry J. Miller

◆ "BY FINANCING the contractor, the jobber is going into competition with established electrical contractors and authorized lending agencies, and will very often be the target of blame if the recipient of his elastic credit policy conks out on his job and is unable to meet his obligations.

"It's up to the contractor to shake loose from this unhealthy situation and unholy reliance upon the wholesaler to over-extend his credit."

Such is the opinion held by President Brown and Milton O. Hollis, executive vice-president and treasurer of the sprawling Raybro Company, of Tampa, one of the largest electrical suppliers in the Sunshine state.

It might seem at first blush that the wholesaler who extends help to his contractor-customers in the form of credit to swing a job the magnitude of which they've never before attempted, would be doing these wiremen a yeoman service, over and above that commonly expected from a materials supplier who should be dedicated to just that chore as his reason for being in business.

But according to Hollis, and as expressed in a phrase in common usage a while back: "T'aint necessarily so."

"The plain fact is," says Hollis, a veteran wholesaler," the jobber, by extending overcredit, may actually be contributing to his customer's financial suicide. At the same time, the casualty in such cases invariably includes the jobber, too. Thus the jobber sinks or swims with his customer and, in many cases, is forced to go along with him subsequently and carry him

Contractors discuss mutual problems and new electrical developments in regular meetings with manufacturers' representatives and supplier.

A variety of information finds its way to contractor customers of Raybro Electric Company, such as bulletins regarding meetings with contractors and notices of code changes.

credit policies

from job to job with the hope of having the indebtedness cancelled piecemeal some day.

"The greatest injustice and disservice the wholesaler can do the contractor is to overlook the latter's capital structure and his functional and organizational adequacy for the job on which he has bid and which his limited finances pressure him into beseeching the wholesaler for credit he shouldn't have."

Nevertheless, Hollis points out that some jobbers will extend this left-handed credit favor and stake a shade-tree mechanic who has landed a job which is obviously too big for him to handle.

"The most important help the wholesaler can supply is to teach his contractor clientele not to solicit the supplier to carry the financial bag until the job is done," adds Hollis.

Incurring ill-will

Hollis points out the obvious fact that the wholesaler who over-extends credit is riding a tiger. If he refuses credit on the commonsense basis of the ineptitude of the contractor to swing the job with his limited finances or limited performance facilities, then the jobber incurs the contractor's ill-will and loses his trade.

On the other hand, if he does extend the required credit structure, the contractor may sink into the morass of his own making, taking the wholesaler with him. In this event the contractor is very apt to blame the wholesaler for not refusing the credit that got him into the jam in the first place!

"When a contractor comes in, we can tell, by the amount of material required for the job for which he seeks credit, if his bid is within reason or not," said Hollis. "It is at this point that the wholesaler can be of inestimable value to the contractor, by educating him in a few principles of good sound economics.

Credit information

"For example, if the contractor intends a job for an unknown general contractor, we can assist by pulling credit information on the general contractor, if this be a non-bonded job.

"If the job is a bonded one, and we can see the contractor isn't going to make any money, we try to dissuade him. It's the jobber's responsibility to guard the inexperienced or poorly-equipped contractor against the consequences of his own folly—even at the risk of incurring his enmity for the time being.

"Certainly the jobber's welfare and that of his customer are closely akin. The wholesaler needs to meet with his customers and stress the importance of collecting from their general contractors at the allotted time for scheduled draws.

"The larger contractors especially," says Hollis, "feel their capabilities for doing more and more work is boundless. Thus they overtax their financial and organizational setups and appeal

(Continued on page 113)

Lighting fixture specialists are available to survey, advise, and price any lighting installation on which a contractor intends to bid.

Better service through efficient material handling

By Beatrice Miller

◆ BETTER SERVICE to customer contractors through faster and more efficient handling of materials was the chief objective of Service Electric Supply Corp. in Wheaton, Md., when they designed their new building trebling floor space. Centralizing a former dual location under one roof, the new building has increased showroom and warehouse space "around a central core," according to G. A. Galblum, president, that makes all areas quickly accessible to personnel.

"We can serve more customers in any given time than formerly. Though we have increased floor space threefold, we have not increased personnel," said Mr. Galblum indicating adjacent showroom, counter and warehouse saved steps and time. "A loading platform enclosed within the building permits the more rapid unloading of materials by rolling hand trucks right into the truck. Wide aisles, accessibility to bins with platform hand trucks, diminishes physical labor in the warehouse. These physical facilities were carefully thought out with the end in mind of saving us labor, time and overhead."

Central core planning

In layout the building is planned around a central core of activity with electrical fixture showroom on one side, electrical materials sales area on the other side, a warehouse in the back of the entire area: the warehouse is accessible from office, showroom and central core.

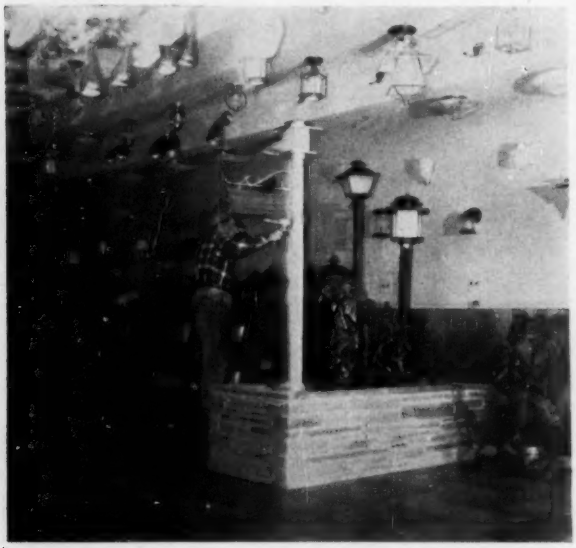
On the first floor warehouse showroom and office comprises 8,000 sq. ft. Of this 1,500 sq. ft. is used by the showroom, 500 sq. ft. by the office. The second floor area of the warehouse comprises 6,000 sq. ft.

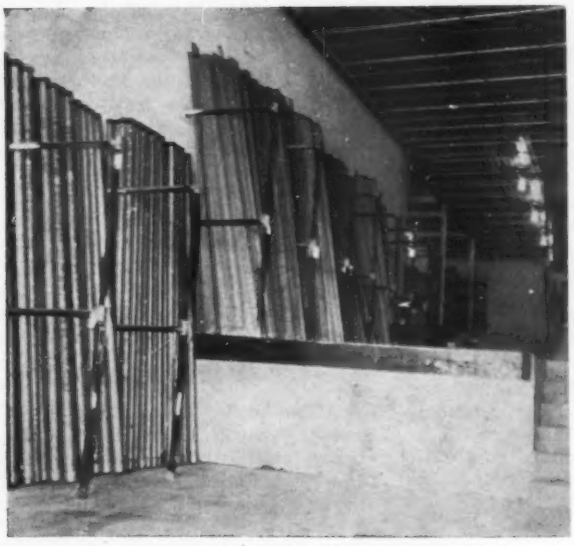
Fixture display

"To display wall and ceiling fixtures adequately, one cannot have enough space. A cluttered display creates confusion and defeats your purpose. To visualize proper effect of an electrical fixture space around it is an important factor," pointed out Mr. Galblum. "We attempted to break up the long stretch of area with outdoor lamps in their natural bases. Two indoor planters were therefore used."

Planning a warehouse adequate for present needs and future expansion meant to partners Galblum and C. H. Cullter, Jr., secretary-treasurer, a two-level operation where heavy materials would not have to be carried any distance, direct contact with the storeroom and counter area by a ramp for easy conveyance of materials, wide and well-illuminated aisles with well-marked bins. A loading platform four feet high enclosed within the building accommodates a tractor trailer protecting materials during unloading from bad weather.

"We recognized that if we did not design the warehouse with access to component parts of the building, we would require increased personnel to service the trade," commented Mr. Galblum. "Customers wait a very minimum





of time as personnel move rapidly to adjacent areas to fill their needs."

On the lower level heavy materials like cable, building wire, fittings, distribution equipment, boxes, etc., are stored. On the upper level fans, lighting fixtures, lamps, etc., are stored. The upper level is reached by a number of stairways; materials are moved by chutes. Upright bins for pipe on the lower level are in close proximity to unloading point.

A 17-ft. ceiling made possible this double level. Aisles of five feet admit the four-wheel platform handtrucks designed to carry materials right out of the unloading truck into the bins.

A factor in obtaining good illumination in the warehouse was painting all walls white and the ceiling aluminum in order to reflect natural and artificial light.

Bins, shelves and racks of the storeroom in the 1,100-sq. ft. counter area are of steel. Bin labels include catalogue number of item as well as description.

Warehouse organization

"In a stockroom or warehouse everything should have a place and be in its place. In a well-organized and well-regulated stockroom no time is lost looking for an item, nor would time be lost in the training of a new person. Items could be located at once," added this wholesaler.

Close at hand behind the counter in roto-bins are the small items which comprise 75 per cent of the pick-up sales volume of the counter trade.

"We have won very favorable comment from contractors commenting on our rapid handling of pick-ups at the counter. Fast service gets their men back on their jobs quickly," said Mr. Galblum.

The entire showroom, office and counter area are both heated and air conditioned. A durable vinyl floor covering throughout office, showroom and counter areas was selected for easy cleaning. Warehouse and loading area are swept and cleared daily of cartons and packing materials.

"Our custodial help takes great pride in keeping the building in tiptop shape. We believe a clean warehouse and storeroom serve efficiency," he commented.

Continuous consultation with contractors

By Hal M. Newsome

◆ ALLIED Electrical Supply of Miami, a relatively new wholesale distributor, has built up from scratch a $1 million annual gross business in a little over two years by giving fast and expert *personal* service to contractors. Owner Sam Segal, former president of another supply house, and his son Fred, a technical school graduate, supervise closely every detail of the business and also make regular calls themselves on all accounts.

Their slogan is "The contractor's troubles are *our* troubles!" Mr. Segal explains, "If we don't help our customer overcome all of his technical and supply problems, we know he can't continue to use our goods—at least to the maximum potential. We also train all of our employes in this cooperative attitude, and motivate and reward them for giving that extra bit of special and outstanding service. We feel that the owner's active example sets the key note for the staff in this respect."

The Segals believe that the best and the most original way to understand and help solve trade problems is by close and continuous *consultation* between wholesaler and contractor. To this end, in addition to the regular calls of outside salesmen, both the owner and his son pay regular personal calls on all customers and go "all out" to help them pinpoint and meet their needs—both on specific jobs and on long-term methods.

This supplier believes in holding regular meetings in their own plant to inform the trade about new items and procedures, but finds that most of the boys are too busy to come much of the time; so personal calls which "bring the mountain to Mohammed" remain the best and most individual way to spread the modern electrical gospel.

Quick delivery required

Despite many innovations in service, the Allied firm finds that the greatest needs of contractors are for fast delivery of *all* materials needed for each specific job, plus expert help in selling, bidding, ordering and installing some items of special equipment with which the bidder may not be fully familiar. Both of these needs, they declare, are best met by regular personal contacts—and often more efficiently by the jobber-owner who has full authority to make special decisions and agreements on the spot.

Long-range help is given by plugging a wide range of special equipment and materials in monthly or semi-monthly calls on prospects. And short-term assistance is provided by making several calls a week on a customer who has an active job going which the firm is supplying.

Value of personal calls

The Segals feel that one of the advantages a small jobber enjoys is that of being able to give more personal attention to each customer without a lot of paper work coming between the two parties. They feel it also speeds up the service in many cases.

Some contractors and factory men criticize many wholesale salesmen for making mostly goodwill and "social" calls on the trade without being technically competent to advise on many of the really knotty electrical problems of the industry. Some go so far as to say that four out of five calls don't produce any real help—just order taking.

Financial aid rendered

They also, occasionally, render special financial assistance such as longer terms or longer amounts of credit, when this is really needed and justified. Both men are capable of helping to plan and layout jobs—Fred's specialty at MIT was lighting and electronics—and their services are backed up by close contacts with outstanding factories and the local representatives of the latter for all special information needed.

Two jobs where contractors often need special help are on switch gear and large panel boards. Motor starters is another tricky field. In these lines factory men have held classes for the Allied staff, and they regularly supply all bid and design information for the trade and often supervise installation.

A bit of extra and outstanding service is sometimes rendered by supervising the unloading of special heavy equipment to put it right where it should go and in good order.

Ample stocks kept

Allied makes a special point of keeping an ample stock of panelboard cans of assorted sizes; for this item, sometimes overlooked, is as frequent a source of delay as

A self service system is provided by stock aisles directly facing the counter. The contractor is encouraged to make his own selections. Grouped items remind everyone of things that might be overlooked.

overcomes supply problems

any in the book. Also on big and complex switchgear, experts can show contractors and designers how the individual units can be assembled in different ways to meet the varying needs of each job. Say there are ten switchgear elements available—these can be assembled in different ways to produce a choice of as many as fifty combinations. Some *one* of these is best in each case, easiest to wire and to use.

An experienced salesman or owner can tell, when he examines a complete list of material for a job, which items already in stock can be legitimately substituted for others when advisable to save time or money. He also knows when in some case the wrong item has been mistakenly specified, one that will not fit or do the job—and can thus correct this in time to prevent delay.

Cost cuts suggested

A full knowledge of new and improved models and materials enables the jobber to suggest ways to cut costs and do a better job. Keeping constant track of other items which have recently been admitted by changes in the Code permits him to inform the contractor of a wide range of possible methods.

Jobber "selling" help, aimed directly at the ultimate consumer, can often aid in the selection of superior equipment for an installation, and result in a more satisfactory and profitable contract. This applies to some store and commercial jobs, but is even more frequent in housing projects, where better built-in fixtures can be sold to the developer with a little intelligent effort—such as better-quality kitchen-range hoods, fans, front door chimes instead of buzzers, and better plates for receptacles.

Allied tells their customers these plates are the "biggest little things" on a job. For no matter how much is spent on wiring, the only things that can be seen, except for fixtures, are the wall plates—and it is worth the small extra cost to put in good ones which are symbolic of a high-grade job.

Another item which tends to be bought for a "price" is the coupling which connects lengths of tubing. There is a substantial difference in the prices of some makes of these; and, while this item does not cause much trouble, a good jobber always points out the consistent advantages of sticking to good brands.

Street or parking lot lighting is an area in which an informed jobber can often be of real assistance —both in bidding and installation, as some contractors are not familiar with steel poles and different types of luminaires, or with anchor bolts and transformer assemblies. It also helps for the wholesaler to urge the ordering of this and other large equipment well *ahead* of time; and to arrange to deliver it directly to the construction spot, each unit exactly when it is needed, even to the time of day. On heavy pieces, this saves the contractor time and money on labor, trucking and security risk.

This same principle of exact scheduling, and timed delivery in sequence, is valuable on all sizable contracts and wins much goodwill. No one but the boss or an efficient supervisor is in position to keep track of this and see that it is done.

This kind of service, plus full stocking of critical items, avoids time spent chasing parts and permits the contractor to reduce his own inventory of reserve and repair stock. Thus he can keep capital liquid for promotion, selling, bidding and geting more business.

Lighting consultation needed

Lighting in general is a subject in which many contractors need education. Even though power companies will supply free designs and there are many specialists in this field, it is still an advantage for a jobber to know his stuff on lighting and gradually instruct his customers in it. Even some architects need help on the practical features of lighting, and some of the existing bad or inadequate

(Continued on page 109)

Fred Segal, left, holds conference with contractor in a personal call. The jobber-owners make these calls regularly, and at short intervals during jobs.

Owner Sam Segal, left, and Bryan Fisher, of Frank Adam Electric Co., look over assorted sizes of panel board cans. Ample stocks prevent holding up jobs.

The P & W Electric Supply Company has just opened its highly efficient warehouse (right) and showroom (far right) in downtown Columbus, Georgia.

Inside bins for vertical storage of steel conduit are located at the far end of several of the long warehouse aisles. Four-foot aisle space has proved ample for movement of material. Forty footcandles adequately light entire warehouse area which is equipped with an inter-com system.

Modern

serves

◆ THE P & W ELECTRIC Supply Company, wholesale distributors of electrical supplies and residential and commercial lighting fixtures recently occupied their spacious air-conditioned and electrically-heated offices, display, and warehouse facilities in Columbus, Ga.

Two entrances and exits make counter area easily accessible at all times. Pegboard on storage shelves exemplify the well-planned utilization of space for attractive display of electrical supplies.

showroom and warehouse contractors and dealers

Owners Will R. White and Jack M. Passailaigue began their present business in 1939 with combined talents derived from an association with the electrical contracting and utility industries. With their present sixteen employees they offer the services of a well qualified lighting engineer for consultation on commercial lighting and an assistant who does primarily residential lighting.

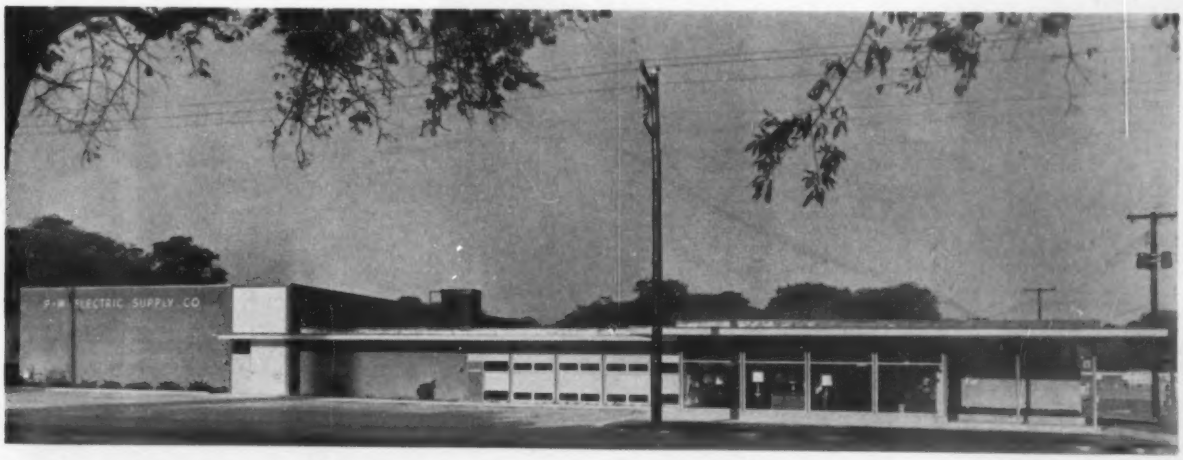
P & W Electric Supply was one of the first distributors in this area to promote electric heating in cooperation with the utilities. They have three men well qualified to layout any type of electric heating job for architects and engineers. Salesmen are well equipped to help contractor-dealer customers where called upon, but do not follow the practice of taking off lists of material and freely circulating them to the trade.

In order to display commercial fixtures to fullest advantage, every lighting fixture permanently installed for functional purposes is of a different type and make. Two offices equipped with louverall ceilings are Wakefield and Guth installations and are easily adjusted from intensities of fifty footcandles to either 100 or 150 footcandles. General lighting throughout all offices average above seventy-five footcandles.

The eighteen-year-old firm now has one of the South's most attractive lighting fixture showrooms where it displays three hundred and fifty different ceiling units along with table and floor lamps.

The one-level building contains 16,000 square feet of floor space and is ideally located on a downtown corner near ninety per cent of the trade which it serves. Customers enter parking areas from two streets.

The warehouse area is amply lighted with 40 footcandles. Talk-A-Phone master stations are equipped throughout the entire building with a low-voltage control system located in the fixture room. Counter areas are easily accessible at all times with two different entrance-exits. Four-foot aisle space is adequate for material movement.



Ideally located on a downtown corner near ninety per cent of the trade which it serves, the one-level building contains 16,000 square feet of floor space and houses office, display and warehouse facilities.

Stockroom

By W. M. Massey

◆ THE BEST POSSIBLE service at the counter, backed by adequate stocks is an unbeatable combination for holding profits and expanding customer trade thinks Ben S. Weil, president of Mayer Electric Supply Co., Birmingham.

And if proof is needed it can be found at this growing wholesale firm where 30 per cent of the gross volume is handled over the counter. Building expansion of equal percentage is underway to further expand stocks.

Counter service, according to Mr. Weil, is built around the best possible counter men obtainable. "Keep the kids off the counter" is Mr. Weil's way of saying "don't pick a boy to do a man's job."

Three men regularly handle the counter sales at Mayer Electric Supply. During the early morning and noon rush hours extras from other departments fill

Stock room, at left, is used as a sales room by encouraging customers to browse around. Below, Mayer Electric Supply Company, located at 3200 Third Ave. South, Birmingham, undergoes thirty per cent expansion.

browsing increases counter sales

in at the counter to always maintain the policy of keeping the customer's time at the counter to the minimum.

This service is reflected in Mr. Weil's own personal policy. His desk is in the open between front door and the counter. During busy periods he is often behind the counter and at all times he is readily available for consultation in person and over the telephone.

The same general policy is in effect at the fixture display and sales room just off the front entrance. Three clerks under direction of Leonard J. Weil, son of the president, regularly handle fixture sales, either with the contractor or his authorized customer. The policy of capable sales help and full stocks in fixtures has resulted in an expansion to double the size of displays effective this month.

The new addition of 7,000 sq. ft. of floor space at Mayer Electric Supply Company will also expand counter space and stocks for contractors and industrial supplies.

As pointed out by the company president the firm squeezes full value out of the stock room through:

1. Backing up the service of counter men and city salesmen.
2. Drawing customers referred by competitors on items they don't stock.
3. Combatting warehouse jobbing and holding up profit percentage.
4. Using the stock room as a sales room by encouraging customers to walk through and look.

"The fact that we emphasize fast service at the counter does not mean we try to hurry the customer out the front door," says Mr. Weil. "Often they are in a hurry and the time saved, when applied against a man's hourly wage, can offset any possible discount he could get elsewhere by spending more time waiting. Some only think they are in a hurry and after being served at counter find time to walk through stock room. In doing so they either find items they had overlooked or else see things they will remember

(Continued on page 101)

Three men regularly handle counter sales. Extras from other departments fill in during rush hours to assure fast service. This twenty-five-year-old firm is undergoing its second expansion in eight years.

The fixture section is being doubled to provide one of Alabama's largest. Three clerks under the direction of Leonard J. Weil, vice-president of the company, regularly handle fixture sales.

Two lighting showrooms serve contractors and their customers

By Warner Ogden

◆ RODEN Electrical Supply Co., 808 North Central Avenue, Knoxville, Tenn., is starting the new year with a new two-room display of all kinds of fixtures for the electrical trade.

It is something different from those usually seen and is designed to help electrical contractors see the latest fixtures in a colorful setting.

The ceilings are made in sections, with sixteen 15-inch squares to a section, and each square is in a pastel hue of green, red, blue or other colors. One fixture is hung from each square. Fixtures of a kind are grouped together.

Wall pegboard displays, set in frames, are still used too.

Roden has always had fixture displays, ever since starting out twenty-one years ago, but the display room was small at first. Expansion of the display has been gradual.

Contractors not only go there, but send their customers to pick out what they want installed. The customers are better satisfied when they can make their own selection. Mrs. Bernice Amburn is in charge of the showrooms and often contractors consult her on what would go best in certain types of homes or buildings. She is always glad to help.

While the writer was at the salesrooms, Luke Bettis of Bettis Electric Co., Gatlinburg, Tenn., walked in.

"You can find anything you want here," he commented. "These showrooms really serve the electrical contractors."

And C. A. Watson, an electrical contractor who had just come in from Oak Ridge, Tenn., agreed.

Mrs. Amburn does all the buying of home lighting fixtures and has complete charge of the showroom. She also maintains complete stocks.

"We carry a good stock and have practically every item listed in the manufacturer's catalog," says H. D. Roden, president. "We only handle

Mrs. Bernice Amburn, showrooms manager, and H. D. Roden, president of Roden Electric Supply Co., examine ceiling units displayed on fifteen-inch squares of pastel shades. Two newly remodeled showrooms offer contractors opportunity to inspect the latest in lighting fixtures.

Mrs. Amburn discusses application of porch-type lighting fixtures, displayed on portable pegboard booth, with electrical contractor.

two lines, because we have found that it is much easier and enables us to carry a bigger quantity of the items we do stock. We can not only show a larger variety of fixtures in our building, but carrying a good stock like that enables us to ship quickly to out-of-town contractors who order from the catalog.

"We have a branch at Bristol (at the Tennessee-Virginia border) which carries the same line of fixtures and has a showroom too.

"Three salesmen cover the territory out of Knoxville and two out of Bristol. They call on the electrical contractors and the hardware stores. We try to see that all of our electrical contractor customers are furnished with new fixture catalogs.

"We ask the contractors to send their customers to our showrooms and most of them do. They would rather use our showrooms than go to the expense of maintaining their own showroom, because they find we can maintain a larger selection from which their customers may choose.

"Electrical contractors tell us they are very well pleased with it.

"We show new ideas in design, including those for modern living. These days there are many changes in homes and Mrs. Amburn keeps up to date with trends. She went to New York for a course in selling fixtures and manufacturers' representatives make regular visits to us.

"Mrs. Amburn works very closely with the homelighting women of the Tennessee Valley Authority and with the home economists. American Home Lighting Institute has recently published minimum lighting requirements for the home and we have circularized these to home builders, electrical contractors and electric utility systems who are interested.

"Contractors can see for themselves in our showrooms what is best for the living room, dining room, bedrooms, kitchen and baths, outdoor lighting of all kinds, patio, front entrance, and garden. Also for playrooms and rumpus rooms. In the last couple of years people have been spending more time outdoors—at their barbecues or gardens, and we show complete stocks of fixtures for outdoor application.

"The focal point of all our fixture business is right there in the showrooms and it is helping electrical contractors in their business. More than half our fixture sales are made through the showrooms."

Collective management benefits distributors

By James Meletio
Engineer
Meletio Electrical Supply Co.
Dallas, Texas

◆ AN APPROACH to management that may be rather unique in the field of electrical wholesaling, yet quite satisfactory and effective here at the Meletio Electrical Supply Co., is our "presidium management."

That is management wherein there is no general manager but, instead, a small board of managers who meet as the need may arise in a presidium meeting in which all matters of policy and planning are determined.

The main purpose of presidium management is the production of benefits from collective thinking. In this type of management, ideas come from the experience, education and knowledge of each member of the presidium. There can be evolved from this collective thinking, a completed policy, or plan, with most of the deviation from extremes removed.

The composition of the presidium is a group of men among whom close trust and admiration exists. As a result of collective thinking, decisions have been made with a minimization of error and a maximum of efficiency in our operation.

All of the members of the presidium are working members of the organization, with definite operational and administrative duties. This has two favorable influences. It keeps the individual up-to-date in matters of economic conditions and newly-developed ideas and products pertaining to his phase of the business. Also, it eliminates the necessity of the organization having to support one or more nonproductive managers, or department heads.

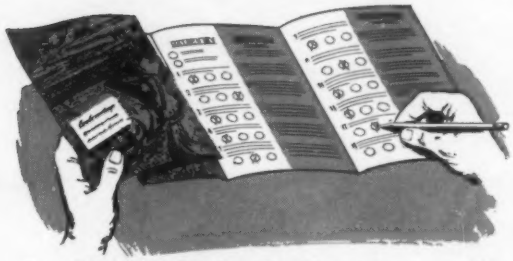
On many occasions partial presi-

(Continued on page 108)

The four Meletio brothers do not employ corporate or other titles but, left to right, they and their specific fields of interest are: James, commercial and industrial lighting; George, residential lighting; Alex, wiring supplies; Jack, major appliances.

Stop explosions before they blow

Send for the CROUSE-HINDS "Hazard Finder"



● The Hazard Finder will enable you to make a quick survey of the hidden probabilities of electrically-ignited explosions in your plant.

Let Crouse-Hinds equipment and technical assistance help you to prevent electrically-ignited explosions.

The more than 15,000 Condulet ® items in the Crouse-Hinds line, include the world's widest selection of explosion-proof and dust-tight electrical equipment. There are Condulet devices for every circuitry requirement, and for every hazardous area and condition. All backed by engineers and technicians thoroughly familiar with Article 500 of the National Electrical Code and its application to specific situations.

For a quick, general survey of probable dangers in your plant, send for the Hazard Finder. For technical discussion of specific areas and hazards, write for Crouse-Hinds bulletins which apply.

• Or for personal assistance, ask any of the offices listed below to send a Field Engineer.

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Planned personal service builds supply house volume

By J. E. Greene
Manager
Central Electric Supply Company
Pine Bluff, Ark.

◆ WHEN WE OPENED for business less than two years ago, our former sales experience in electrical equipment distribution helped us to evaluate our customer, the electrical contractor. With our total of thirty years experience in selling contractors, Harold Hanna, our operating manager, and Wayne Coffin, salesman, teamed with me to set up a service program that would catch the attention of our prospects and hold them as regular customers.

The electrical contractor needs constructive service from his supply house. He often needs advice regarding materials, and he values time-saving methods for buying those materials and having them at the job when he needs them. What we do in giving our customers this kind of service is not new. The value lies in the fact that what we do is planned, and our service program is followed consistently.

Our first aim is to supply superlative catalog service to all of our customers, making sure that contractors have up-to-date catalogs of a good distribution of manufacturers. We send price changes out to every one who receives catalogs from us. Soon after the price changes have been mailed, we telephone the contractors. Discussing price changes is a good excuse for the call—another opportunity for the personal customer-contact that we cultivate.

Our catalog library here in the store attracts customers, who value the orderly arrangement of the shelves and the good light we provide.

That well-filled catalog collection is planned to remind the electrical contractor again that we operate a one-stop shopping service for him. All electrical contractors look for adequate stock in the supply house that serves them.

We feel that the main difference

(Continued on page 104)

A well-stocked library supplements catalog services.

J. E. Greene and Harold Hanna check contractor's blueprint.

Salesman Wayne Griffin gives fast service at city counter.

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The CIRCLE F NO-KLIK® Quiet Switch is a superior mechanical switch (not a mercury switch) made of heavy sturdy Bakelite with special non-welding silver alloy contacts – operates on A.C. current *in any position* for both incandescent and fluorescent lamp loads. No other switch offers you a more golden opportunity to cash in on the quiet switch market than the CIRCLE F NO-KLIK® Quiet Switch. Contact your local Circle F representative or write Circle F direct for more information.

*3401 and 3403 – 15 Amps – 120 Volts A-C [L] – 15 Amps – 120-277 Volts A-C

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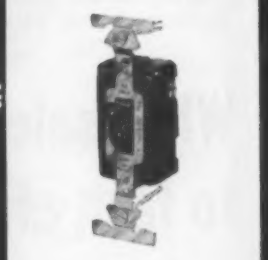
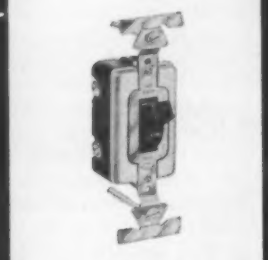
**3421 and 3423 – 20 Amps – 120 Volts A-C [L] – 20 Amps – 120-277 Volts A-C only

3401*
15 AMPS – 120-277 Volts A.C.



3403*
15 AMPS – 120-277 Volts A.C.



3421**
20 AMPS – 120-277 Volts A.C.

3423**
20 AMPS – 120-277 Volts A.C.

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Warehouse and parking lot above are part of the properties of Cabell Electric Co., of Jackson, Miss., which cover almost an entire block.

Wholesale firm credits success to fast, efficient service

By Ernest Watson

◆ NEARLY FORTY years of service, attested by thousands of satisfied customers throughout the state, is the record of the first and one of the largest wholesale electrical supply houses in Jackson, Miss.

Cabell Electric Company claims their main purpose in business is to render fast, efficient service, especially to electrical contractors, and, in order to do so, they maintain a complete stock and a working team "par excellent," according to Mack Johnson, manager of the electrical supply department.

The Cabell Electric trade area consists of a large circle, with a radius of about 150 miles, as very few of the other cities in Mississippi have wholesale electrical supply firms. From the Mississippi Gulf Coast, north through Meridian on Mississippi's eastern border, to Columbus, west to Clarksdale, and south to Monroe, La., it makes more of a large box on the map.

Cabell does not have the field to itself, by any means, however, for there are six other major electrical firms wholesaling to contractors in Jackson and throughout the trade territory. Four outside salesmen cover the area with one concentrating on the Jackson contractors alone, which number fourteen or fifteen large ones and numerous small electrical contractors.

The present organization began back in the old "knob and tube" days, organized in April, 1919. T. B. Cabell was the original incorporator and the customers of the closed corporation at that time, consisted of the municipal light plants in state communities, electrical contractors, what few there were, hardware stores and electrical retail stores.

The original purpose of the Cabell Company was to distribute electrical supplies and small appliances. With the advent of radio receiving sets in the area, about 1924, the firm decided to take on the distributorship of this new item. The latter part of that year, Mr. Cabell came into control of all of the stock of the corporation and changed the name to its present one. Soon thereafter, the building that now houses the company was built to house the then approximately fifteen employees.

With the coming of the late '20's, the business grew until the Big Depression hit Jackson and Mississippi, a real catastrophe to what was a largely agricultural economy. After surviving the depression, the Cabell company began again. The advances in knowledge of electricity and its uses began a boom which received increased impetus by World War II, although it curtailed a large part of Cabell's business because the building in the state came to a standstill.

And it sure put a crimp in the Cabell business organization, according to the treasurer, W. M. Berry. The original founder, T. B.

From left to right, Wes Jameson, Natchez contractor, Earl Foil, warehouse manager, and Mack Johnson, electrical supply manager, inspect recent purchases made by Mr. Jameson at Cabell Electric Company.

Cabell, having died in 1935, the actual management of the firm had fallen into the hands of his sons, Breck and Frank. Both were young then, and consequently served in the Armed Forces during World War II as did most of the Cabell employees, for only thirteen were left to continue the business.

With an increased utilization of electricity for home, business and industrial use, the number of electrical contractors grew and so did the electrical supply houses in the state. Rural electrification began increasing the need for more and better electrically equipped homes, farms and businesses.

Cabell, however, in 1932 had been appointed distributor for fifty-one Mississippi counties and eight Louisiana parishes (counties) by the Philco Corporation who at that time manufactured only radios and radio-phonograph combinations. They now handle all types of Philco products.

Jackson, particularly, and Mississippi as a whole has experienced a construction boom that shows no signs of tapering off. Huge office buildings have been added to the skyline in recent years and more are in the foundation and blueprint stage. Hundreds of new industries have been brought to Mississippi by the Balance Agriculture with Industry Board and other organizations interested in industrial development of the state.

Residences by the thousands have been constructed in the last ten years in Jackson and throughout the state, all requiring more and more and the latest in electrical equipment and wiring.

Contractors, whether customers of Cabell or not, can get assistance of most any type in working up their bids and quotations. Upon request, Cabell will quote on an entire list of materials for any job that a contractor furnishes them.

At present, one third of the eighty employees now at the greatly-enlarged wholesale firm are in the electrical supply division. The other departments consist of the floor-covering department, housewares, Philco, and electronic parts departments, all with separate managers and sales forces.

The Cabells became distributors for Armstrong Floor Coverings in 1945, with the electronic parts department being established in 1948 to stock all the necessary parts to repair radios and television sets.

Specializing in fast, economic and efficient serving being the idea, the electrical supply department boasts that any order received by 4 p. m. one day is in the hands of the contractor by 8 a. m. the next morning.

The order reaches the office personnel, headed by Johnson, with Sam Parrish as his assistant, and is processed for the warehouse. Earl Foil manages the warehouse crew, while Hartwell Cook oversees the salesmen in the department that gets the orders.

The bins and racks in the warehouse are so laid out that the warehouse crew can load up a contractor's order in minutes and get it on the loading platform ready for a truckline's pick-up. Cabell doesn't deliver outside the city of Jackson, but, uses the trucklines, most of whom have terminals in Jackson, to deliver the goods.

The growth of the company to what it is today parallels the growth in the industrial development and economic progress made by Jackson and the rest of the state. The building occupies almost an entire block, across the front, including the parking lot, and stretches through to the street behind. Eighty persons derive their living from being employed at the Cabell firm, ninety per cent of whom are homeowners with families contributing, too, to the economic welfare of the city and state.

Wholesaler helps contractors through "limited-line" policy

By Harry J. Miller

◆ "WE FEEL that our greatest sphere of helpfulness in enabling our electrical contractor-customers to save money, lies in the fact that for close to two decades we've adhered strictly to the policy of handling one line of merchandise."

So speaks James Meier, vice-president of Tampa's Florida Electric Supply, Inc.

"For example," Meier adds, "the contractor and his journeymen know that when we deliver boxes or controls or panels, they're invariably of the same manufacturer's brand. This means that the contractor's men are alerted in advance, of the sizes of the equipments long before they're delivered. Thus they can prepare for the installation before they even see the materials delivered to the job.

"In that way there is no guesswork as to dimensions, or needless waiting before planning an installation. And this all adds up to saving the time of expensive mechanics.

"In addition, our own employees, saved by bewilderment by a large variety of merchandise brands, become experts at identifying the lines we carry. In turn, this means that when a contractor steps up to our sales counter for some item, he gets instant service, untrammeled by the need for waiting while clerks thumb through voluminous catalogs seeking the items he needs.

"Again, this spells added economy of the contractor's valuable time."

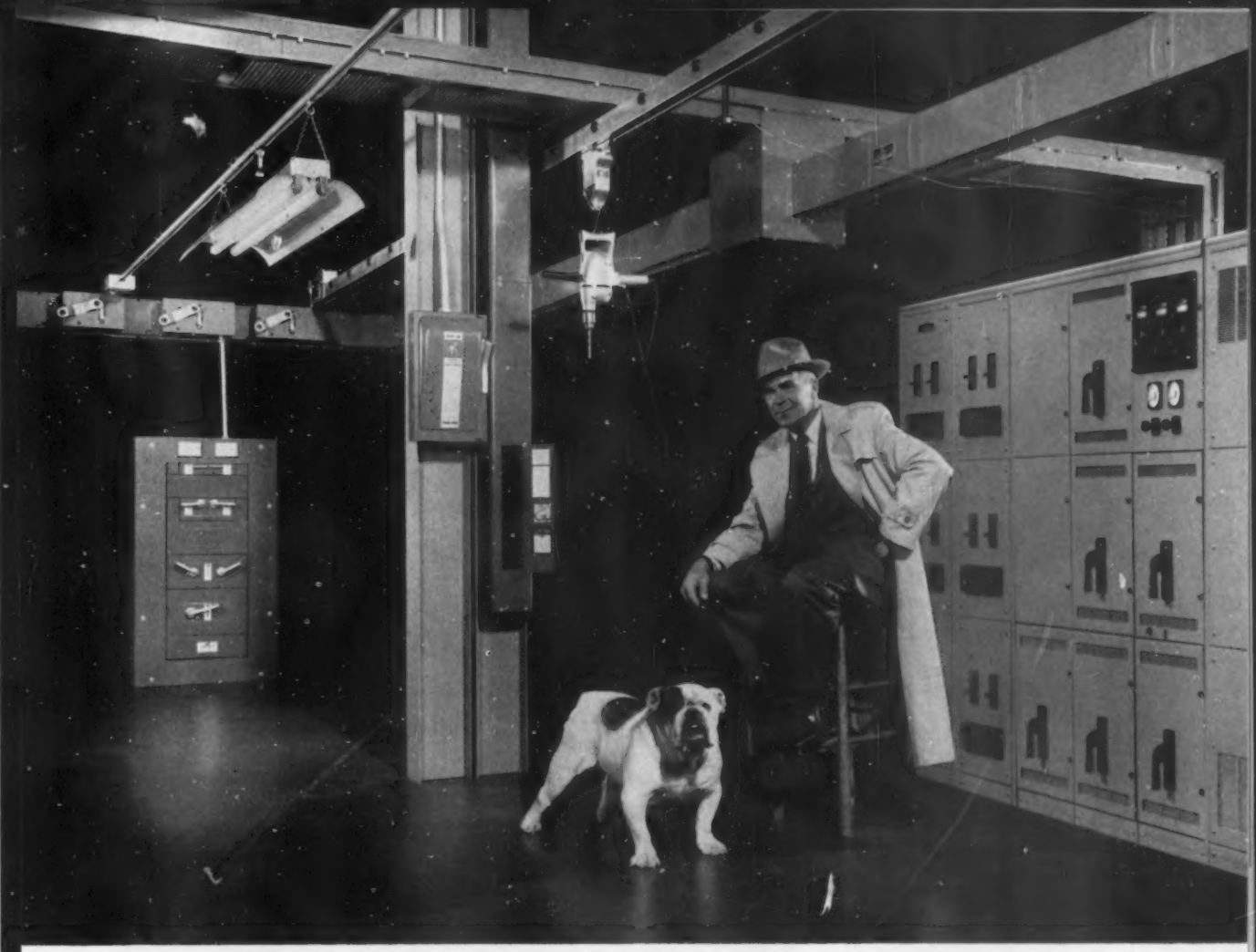
From the point of view of Meier, whose company started with five employees and has developed until today over sixty people comprise the staff, including eighteen outside salesmen calling on electrical contractors, utilities and industrial concerns throughout Florida and South Georgia, it pays to stock only a few lines, but these must be in the fullest depth, breadth and scope.

"It's true," said Meier, "that this policy sometimes costs us real money, because opportunities arise to purchase job lots or electrical merchandise of questionable repute, at bargain prices. We shy away from these and stick to wiring materials with which our customers have been conditioned, secure in the knowledge that we are thus conserving their labor costs.

"After seventeen years of wholesaling, we virtually have the same lines we originally started in business with."

Another major direct benefit ac-

(Continued on page 105)



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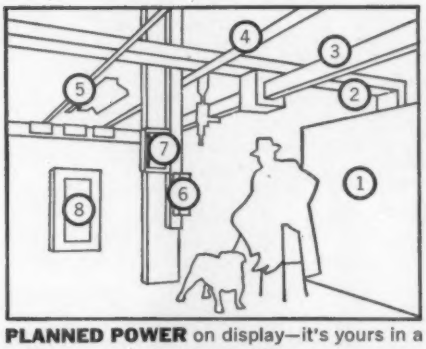

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Contractors tell how

Unconventional jobs offer greater challenge and profit

By Jack Stone
President
Jack Stone Co., Inc.
Arlington, Va.

◆ WE LOOK for the unconventional job. We enjoy the challenge to our engineering know-how when a job turns up that cannot be met in routine procedure with standard equipment. The unconventional job generally becomes a more profitable job by virtue of the special design and fabrication entailed.

We were recently called upon to intensify the lighting in the main foyer of the Washington National Airport, a job in which we had to devise our own means of meeting problems. The Airport Authority building obtained its general lighting from a series of circular coves, twelve in all, using incandescent lighting. Lighting from a fixture in a 30-ft. ceiling provided only 1½ footcandles at actual floor level.

As one of the most heavily trafficked airports in the country, second only to the New York Airport Authority's size in numbers of daily travellers, it was important to have an outstanding job of illumination in the airport of the nation's capital. Inadequacy of illumination became even more acute during evenings. Our objective was to bring lighting up to eight footcandles or better.

However, the standardized lighting fixtures we had to choose from would not fit the problem in hand. A special fixture had to be designed and fabricated to meet the situation.

Collaborating with the chief of the electrical branch of the Washington National Airport we designed a fixture of 39,900 lumens—there were to be twelve fixtures in all—to be recessed in the existing precast plaster domes. This was a multiple high intensity slimline fixture, tailor-made, using metal louvers on the lower side, and access doors for servicing.

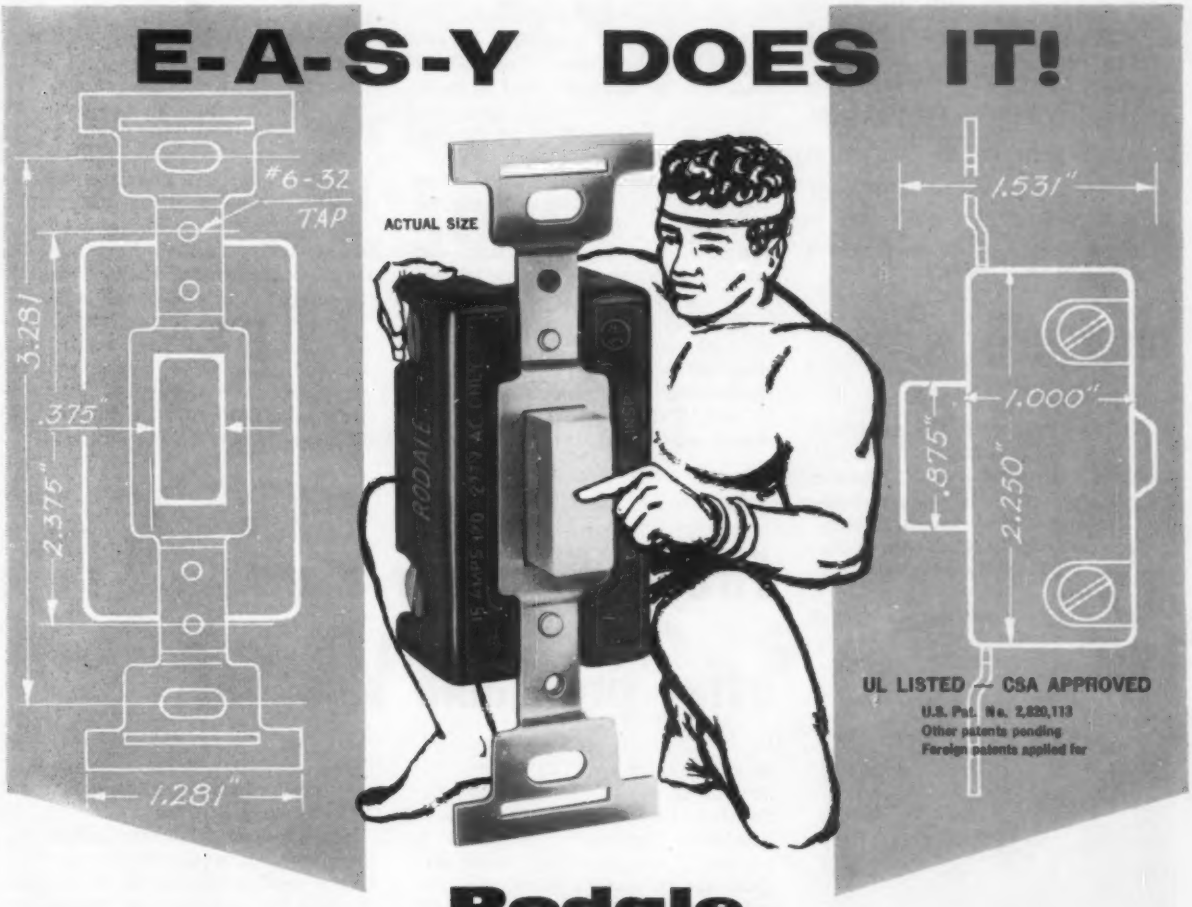
The fixture is circular, measuring seven feet in diameter. Each half of the circle includes three 72″, two 64″, one 48″, and one 24″ T-12 instant start high intensity slimlines spaced on 5⅞″ centers.

Supported by an all angle iron welderman attached to existing channel iron members, the fixture is thus floated using ½-in. thread so that proper adjustment to ceiling level can be made. Ballasts are centrally located in the fixture for easy access by the maintenance agency servicing the fixture. The louvered section is hinged so that it will not fall during maintenance.

One of the problems presented by a fixture in a 30-ft. ceiling is servicing. We used a 30-ft. collapsible steel mobile scaffold, operated hydraulically, in installation. The scaffold has special outriggers on it.

Two workmen of Jack Stone Company are shown atop the 30-foot collapsible steel mobile scaffold used to install the circular lighting fixtures designed especially for mounting in the 30-foot ceiling of Washington National Airport.

E-A-S-Y DOES IT!



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"B" Touchette®

No knob to turn. No toggle to flip. Now, there's a switch designed for today's *push-button living*. It's "B" Touchette, the touch switch with feather-light operation. Not only that . . . but when you specify Touchette for new construction or remodeling jobs, you have easy installation, as well. Touchette measures just *one inch* in depth . . . allows for quick, simple installation . . . even in boxes where several wires enter.

Touchette needs no special wiring . . . fits standard outlet boxes and toggle wall plates and operates on full line voltage. Rated 15A—120—277V, it withstands motor loads up to 80% of rated capacity.

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Available in single pole, double pole, 3-way and 4-way models. Brown or ivory touch button.

Sold only through electrical wholesalers.
Or for further information and prices, write: Dept. S1.

Rodale manufacturing co., inc. emmaus, pa.

There is plus satisfaction in having met our objective of better illumination with pleasing effects, because we had to devise the means of obtaining the right results.

Weigh--don't measure wire

◆ IN PRICING OUT housewiring jobs, to give his customers a fairer deal, and to keep more accurate and easier account of wire in less-than-roll packages, Sarasota electrical contractor R. C. Redinbo devised a system of weighing the wire instead of measuring it.

Footage measurement is time-wasting. Running the wire through a measuring machine is subject to error caused by slippage. Weighing it off eliminates these bottlenecks to production, and also accounts for every foot of wire used on, or to be charged to or credited back from a job.

No wire less than a roll leaves the shop without being weighed. Its weight going out to a job is recorded on the job sheet, and whatever is returned from the job is similarly weighed off.

Redinbo has worked out a table of feet per pound for the most-used wire, and a fast calculation makes the conversion from pounds to feet. This provides an accurate figure on the amount of wire to be charged to the job. It also saves time measuring partial coils, because after weighing, such coils are tagged with the amount of wire they contain so a quick look tells a wireman if the coil contains enough wire for a proposed job.

Full coils are charged out as footage; the pieces that return are checked in by weight and this is converted to footage. For example, 14-2 Romex runs 15 feet to the pound. If what's returned of a 250-foot coil weighs 10 pounds, this is 150 feet, thus 100 feet were used on the job. Since a full coil is weighed in its carton, Redinbo thus gets paid for the carton too, and this makes up for any waste.

The following is typical of tables used by Electrical Contractor R. D. Redinbo to convert pounds to feet, thus speeding up the process of wire handling and providing a more accurate method of cost-accounting.

Romex 14-2	15	ft/lb
Romex 14-3	10	"
Romex 12-2	10.4	"
Romex 10-3	5.68	"
UF 14-2 with grd. cond.	12.5	"
UF 12-2 with grd. cond.	9.6	"
TW #14, 1-cond.	50	"
TW #12, 1-cond.	38	"
TW #10, 1-cond.	25	"
TW # 8, 1-cond.	15.6	"

Fire and burglar alarms offer profitable side line

◆ A BRIGHTLY PAINTED jeep on the streets of West Monroe, La., reminds business people that Cheeks Electrical Service is prepared to protect their property. Used exclusively to serve commercial and industrial customers, on a maintenance basis, for alarm systems for fire, holdup, and burglary, the jeep, manned by an electrician, proves a valuable addition to the Cheeks service fleet.

Banks, stores, public buildings, and manufacturing plants use the alarm service. Owner C. P. Cheeks installs the systems and maintains them on a monthly charge basis.

(Continued on page 109)

David Cheek, son of owner of Cheeks Electrical Service, poses with his favorite vehicle—the "alarm jeep" which is used effectively by Cheeks to promote fire and burglar alarm maintenance service.

Used by MORE CONTRACTORS than any other brand- BY MILLIONS EVERY YEAR!

Some surveys have shown IDEAL Connectors first choice by up to *5 to 1* over the next leading brand. *Maybe so!* The important fact — proved by continuing surveys — is that contractors just plain like IDEAL Connectors *better*, for *more* jobs than any other brand — by millions! They know they can depend on them to perform as promised.

In short, these contractors KNOW QUALITY — WANT QUALITY — and BUY QUALITY.

If you aren't using IDEAL Connectors, you're in a minority. *Better check your reasons* — or join the switch to America's top brand of Wire Connectors — IDEAL.

IDEAL

WIRE CONNECTORS

IDEAL Wire-Nuts® CONNECTORS

the lifetime-tight, wire crushing grip that NEVER LET'S GO!

- just screw them on — like a nut on a bolt!

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Screw-and-lever and wedge action with FORCE OF UP TO 2½ TONS flattens wires and multiplies contact area

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Closer tolerances!
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FLASH-PROOF! HEAT-UP PROOF!

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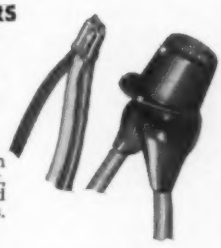

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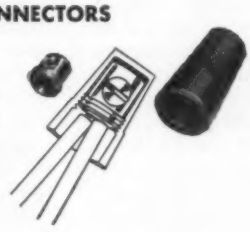

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Understanding the Code

By Walter R. Stone

This article should be especially helpful to the following readers:

- Electrical Contractors ✔
- Electrical Utilities ✔
- Electrical Wholesalers ✔
- Electrical Inspectors ✔
- Industrial Engineers ✔
- Consulting Engineers ✔

◆ LAST MONTH we discussed the proper method of studying and learning to use the National Electrical Code. We provided answers to ten questions which had been selected from the Introduction and from Article 100 covering definitions. And we answered one question and illustrated it by a sketch regarding the size of a branch circuit supplying a dual-purpose receptacle.

This month we will go a step further with answers to questions on the general requirements covered by Article 110 as well as questions on the beginning of Chapter 2 covering Polarity Identification of Systems and Circuits and then proceed somewhat deeper into Branch Circuits.

Any reference to "General" as covered by Article 110 is likely to raise a question similar to the following which has been asked frequently: Why is Article 110 headed "General," and Article 300 headed "General Requirements for Wiring Methods"? In short, why aren't they combined under olny one General heading instead of having two?

The answer to this question is not easy if by "answer" we mean that which removes all confusion. Before attempting an answer, then, I would like to emphasize the importance of remembering that both of these sub-divisions do in fact exist and that if you cannot find the ruling which you are looking for anywhere else, you can usually find it under one of the "Generals."

In a sense, the first General may be classified as "Major" and the second as "Brigadier." The second one concerns wiring methods *only*, and even excludes certain groups of the methods which pertain to communication, remote-control, low-energy power and signal systems. Whereas the second one concerns only that brigade of rules known as "methods," the first General covers some basic rules connected not only with wiring methods, but also with other phases of equipment and installations, including criteria for judging such equipment and its uses.

Headings hold the key

In each instance, the wording is indicative of what is covered under each heading. This is true of all Code headings, whether they be Chapter, Article, or Section headings. And this brings us to another very important point in studying and using the Code: watch the headings, use them as they are intended to be used, and connect the section rulings directly with the headings. Although this may sound elementary, it is fundamental, and disregard for this simple rule is one of the prime reasons for misunderstanding and confusion in connection with the Code.

A few examples will serve to illustrate the point: Read section 4326 as an independent section. Next read it as a part of the heading "Motor Overcurrent Protection." Then read section 4345 independently and next as a part of the heading "Motor-Branch-Circuit Overcurrent Protection." Which method is most likely to result in confusion?

Now read section 4543-b independently and afterward read it as a part of its parent section 4543. Independently, it seems to refer to *any* door in a transformer vault. Taken as a part of section 4543, it clearly refers to only such doors which lead from the vault into the building and not to those which may open out onto a sand lot. (I have, at different times, wished that it did refer to *all* doors, but that is beside the point).

There are numerous other examples, especially in Article 500 which positively cannot be understood unless studied properly. This complicated article, however, will be taken up at a later date with special emphasis on methodical analysis. Consequently, no examples will be taken from it at this time. The point to remember at this stage is that each separate statement in the Code must be studied in conjunction with related headings and not out of context.

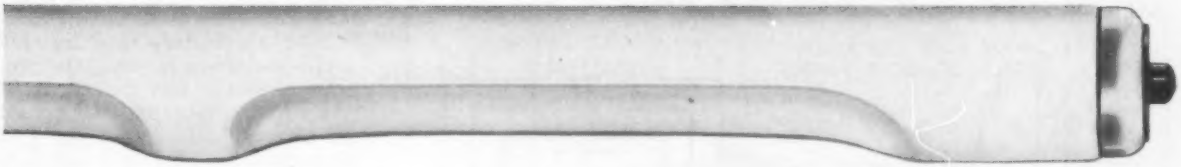
In the next issue, we will buckle down somewhat, keeping in mind the fundamentals, and attack, at the same time, several specific issues. It is still too soon to bring up one very important question under Article 110. We will come back to it, however, at the proper time in a future issue.

Questions on the Code

QUESTION: Is it permissible to terminate one 50-ampere range circuit containing two #6 phase conductors and one #8 neutral in a junction box and tap off with two sets of 3 #10 conductors or with two sets of 2 #10 conductors and one #12 neutral in each set to supply a range top with one tap and an oven with the other tap if the 10-foot and 25-foot rules are observed? (See sketch on page 54)

ANSWER: No. The 10-foot and 25-foot rules of section 2434-c and 2434-d were never intended to permit such practices as referred to here. A range top and a range oven, when manufactured as two separate units, are two separate appliances — not one single appliance. Section 4222 states that "*Every* appliance shall be supplied by a branch circuit of one of the types specified in Article 210." Section 2121-b and section 2121-c of Article 210 limits the size of conductors supplying ranges of 8¾ kw or more rating to a minimum of #8 for the phase conductors and #10 for the neutral.

Neither an oven nor a set of



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AT ERICKSON TOOL COMPANY (above), 450 G-E Power-Grooves, eight feet long, mounted 10 feet high, with 10 feet between rows, maintain a lighting level of 160 footcandles economically. This means there is plenty of light right at the machines (see footcandle reading at right)—where extra light means extra safety, extra accuracy for workers. No supplementary lighting is needed. Powerful Power-Grooves do it all!

While plans for their new building were still in the early stages, officers from Erickson Tool Company of Cleveland, Ohio, visited the Lighting Institute—General Electric's lamp headquarters at Nela Park. There they saw the whole array of lighting methods and discussed the powerful new G-E Power-Groove Lamps.

They were shown how these revolutionary lamps provide outstanding general lighting, making it unnecessary to use supplemental lighting on individual machines (like that used by Erickson toolmakers in their old plant). They saw how powerful Power-Grooves would fill a plant with pleasant light that's easy on the eyes . . . as well as the pocketbook. The decision was made: Erickson's new plant would have G-E Power-Groove Lamps throughout!

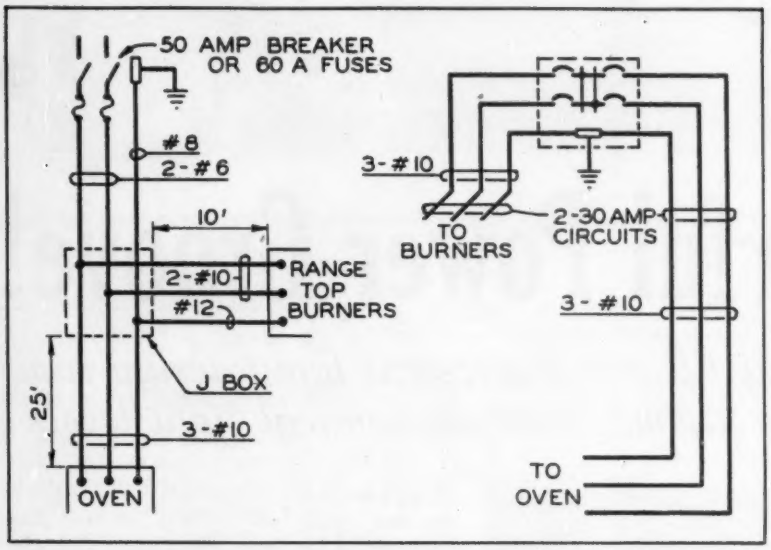
Because G-E Power-Groove Lamps give nearly twice as much light per tube as High-Outputs—2½ times as much as 8-foot slimlines—your customers can get more light per fixture—with fewer parts to maintain. And compared to other fluorescent systems, they can save 5-20% on their initial investment.

Get the whole exciting Power-Groove story. Write General Electric Co., Large Lamp Dept. ES-18 Nela Park, Cleveland 12, Ohio. Better still, visit Nela Park and let us show you on-the-spot demonstrations of how the powerful Power-Grooves can work for your customers.

WORLD'S BRIGHTEST WORKSHOP—Now you can see powerful Power-Grooves in action . . . lighting the world's brightest workshop. It's at the G-E Lighting Institute at Nela Park. Plan to visit it and see for yourself.

Progress Is Our Most Important Product

GENERAL ELECTRIC



The wiring method shown at left for a separately installed oven and range top is not permissible, according to the author. The arrangement at right, utilizing two separate circuits of proper size, one circuit to each appliance, is the proper method of wiring built-in ovens and top burners.

burners, however, when taken alone and separate, constitute a range. They are, instead, appliances. And, as already stated, they constitute two separate appliances. Each unit, therefore, should be wired as a separate appliance with an individual branch circuit to each unit. It is my opinion that each such appliance could be wired with a 30-ampere branch circuit with 3 #10 conductors and remain within the intent of the Code, provided of course, that the connected load in each case did not exceed the carrying capacity of the #10 conductors as rated in Table 1 of Chapter 10. I would not recommend using a neutral smaller than #10, however, because of the need for mechanical strength.

Here it is well to mention that neutrals, even when #10 and larger, should not be used for equipment grounding conductors on appliances which are generally referred to as "split ranges." A complete range is intended by the manufacturer to be so grounded by the neutral conductor. Section 2560 of the Code permits the use of the neutral conductor as the equipment grounding conductor on ranges and clothes dryers where served by 120/240 volt 3-wire branch circuits, provided that such neutrals are not smaller than #10.

Range tops and range ovens, however, are not intended by the manufacturer to be so grounded, and the Code does not permit this practice. True, the manufacturer has provided a connection to be made for using the neutral for

(Continued on page 115)

Code test questions

1. To prevent blocking of working spaces adjacent to exposed live parts, such working spaces may be used as passageways. True or False?

2. All wiring methods recognized as unsuitable are listed as "Not Permissible for Use" by the Code. True or False?

3. Parts of electrical equipment which in normal operation produce arcs, flames, or molten metal need not be enclosed if separated and isolated from all combustible material. True or False?

4. A passenger station operated in connection with an electric railway may be wired for lighting and power by circuits connected to a system containing trolly wires with a ground return. True or False?

5. There is no actual Code requirement, but only a recommendation, that electrical equipment be installed in a neat and workmanlike manner. True or False?

6. If, on a 4-wire delta-connected secondary, the midpoint of one phase is grounded, that phase conductor having the higher voltage to ground shall be identified (marked) by painting or other effective means:

a. At any point where a connection is to be made unless the neutral conductor is present.

b. At any point where a connection is to be made if the neutral conductor is present.

c. Only at the weatherhead, in the meter socket or C. T. can, and within the service switch enclosure.

Which applies: a? b? c?

7. A cable containing a white (identified) conductor may be used for single-pole, three-way, or four-way switch loops provided that:

a. The white conductor is used as the return from the switch to the outlet.

b. The unidentified conductor is used as the return from the switch to the outlet.

c. The white conductor is painted inside each switch enclosure.

Which applies: a? b? c?

8. The size of a branch circuit is classified in accordance with:

a. The size of the connected load.

b. The size of the circuit conductors.

c. The size of the overcurrent device.

Which applies: a? b? c?

9. An equipment grounding conductor shall be:

a. Green or bare.

b. White.

c. Wound inductively in at least one location to prevent the flow of current.

Which applies: a? b? c?

10. In multi-wire branch circuits:

a. Half the red conductors and half the black conductors shall be connected to each phase bus.

b. The conductors may be connected in any manner provided that the red and the black conductors are connected to the phase buses and the white wires to the neutral bus.

c. All circuit conductors of the same color shall be connected to the same ungrounded feeder conductor throughout the installation.

Which applies: a? b? c?

Answers to questions will be found at end of article.

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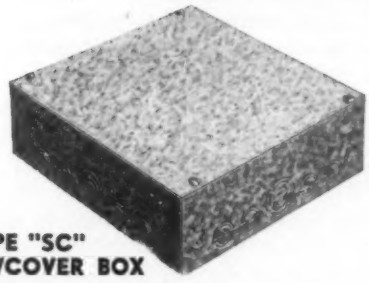

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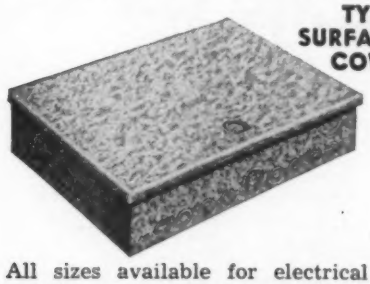

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WIREWAYS and DUCT

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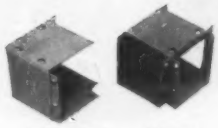
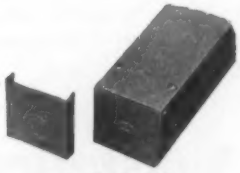


ELBOW and TEE

"U" CONNECTOR



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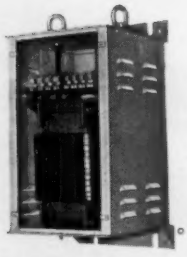

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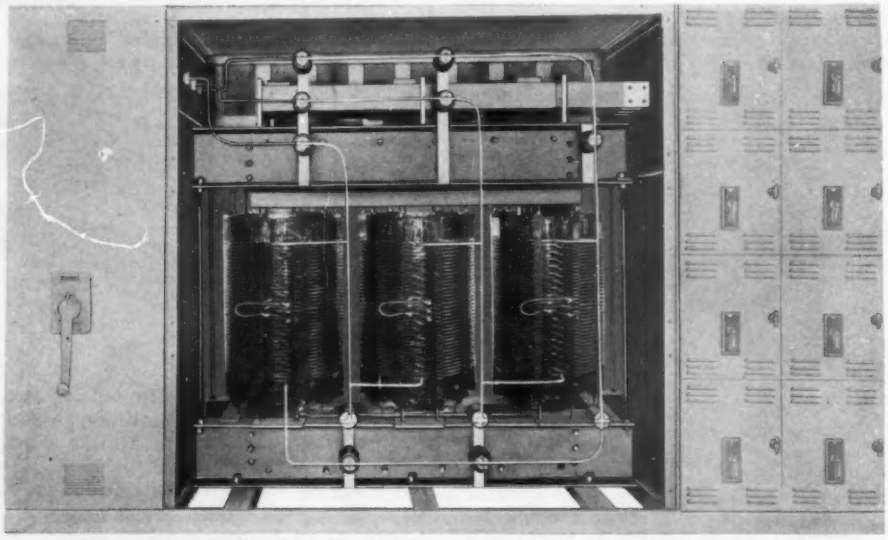

1000 Kva 13,200 volt Sorgel dry-type transformer in a substation—Compartment panel removed

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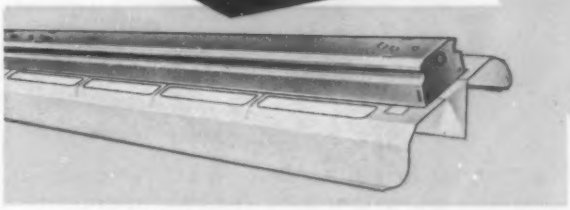

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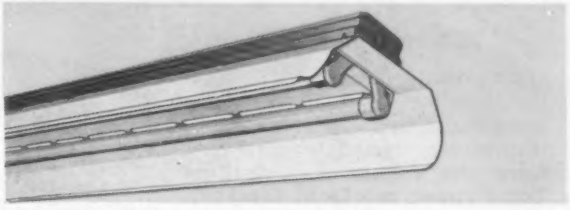

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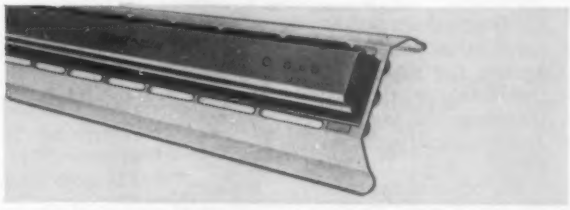

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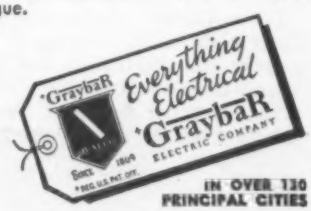

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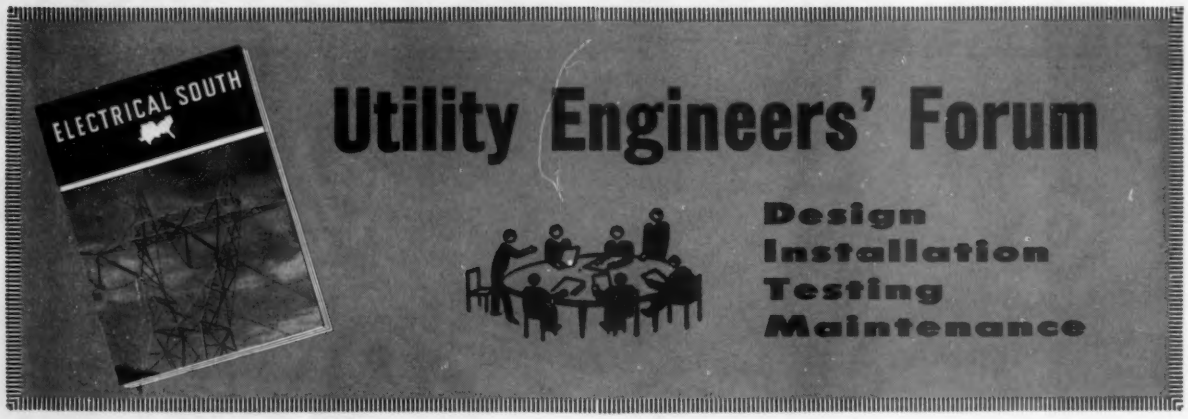

Texas engineers talk distribution

◆ THE TENTH annual power distribution conference, sponsored by the Electrical Engineering Department of the University of Texas, and headed by Professor B. N. Gafford, attracted more than 300 utility and industrial engineers to hear its three-day schedule of talks and discussions on distribution problems.

T&D Investment 68%

If the conference needed any justification for its existence, it was to be found, perhaps, in one of the diagrams presented by Carlos O. Love and Johnny Ray, both of Texas Power and Light Company, in their comprehensive paper on "Selection and Application of Power Transformers for Distribution Systems." This diagram presented the ratio of investment required for distribution, transmission and generation for the TP&L system for the past several years and indicated that distribution now accounts for nearly 50 per cent of the total, while distribution and transmission together represented approximately 68 per cent of the total.

In discussing their subject, Messrs. Love and Ray pointed out that there are many design and operating factors to consider in choosing a substation transformer. These factors are so related that any change in one usually affects the others. All factors, not just one, must be considered for "there is no single type or design of transformer that meets all the modern operating requirement for power and distribution use. The operating requirements must first be met, then the economics in use of the different usable transformers can be considered.

Among the factors that must be considered are size, voltage, reliability of service to customers, transformer impedance or short circuit currents, modification of present substation facilities, and losses.

The concluding portion of their paper discussed thermal loading of transformers. "Permissible transformer loading is not the whole criterion," they reported. "A proper balance should be sought between regulation, voltage levels and emergency standby. It may be shown that an increase in load from 100 to 125% at 80% power factor increases the voltage regulation for an average transformer 1.8% or 2.25 volts based on 125 volts secondary base. However, an increase in load from 100 to 125% at 100% power factor increases the voltage regulation for the same transformer only 0.3% or 0.38 volts based on 125 volt secondary base.

"We must also remember that the transformer bank can be overloaded only if the overload is within limits of the transformer oil expansion, bushings, leads, tap changers, and the associated substation equipment such as circuit breakers, disconnect switches, current transformers, etc. Other than the design and mechanical limitations, the economics in overloading the transformer must also be considered."

Sources of trouble

A special feature of the first day of the conference was a panel discussion on "Sources of trouble on distribution systems," the participants representing viewpoints of both utility company engineers and industrial engineers.

L. D. Cronin, electrical engineer for Ebasco Services, Inc., New York, served as chairman and moderator of the panel. In his opening remarks, he pointed out that the most frequent causes of system troubles are: weather; material inadequacy and misapplication; unfavorable environment such as corrosive atmosphere; improper design, inadequate clearances, etc.; lack of proper maintenance; and accidental contacts such as automobiles striking poles, cranes striking overhead lines, or diggers damaging cables.

System planning can reduce distribution troubles, Mr. Cronin said, mentioning such items as adequate construction standards, good workmanship and proper supervision, material specifications, testing of new and redesigned materials, and exchange of information on equipment troubles.

The utility viewpoint on distribution troubles was further presented by B. M. Gallaher, distribution planning manager, Texas Electric Service Co., Fort Worth. He reviewed the various types of trou-

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ble being experienced and told of tests which his company was conducting on a ten mile 15-kv lateral designed to incorporate wood insulation into its construction, using 8-foot crossarms, ridge-pin construction, and wood strain guy insulators.

Economics of outages

In discussing the economics of distribution line outages, Mr. Gallaher said: "The analysis of this problem should be approached with a completely open mind. The variables are many and are very hazily defined. It is believed that a "standard of service" based upon either experience or company policy should be one of the first criterion to be brought into focus. Secondly, the analysis of the behavior of a given distribution system should be developed from records. This experience includes such factors as 'human errors', 'equipment failures', 'weather', annual outages per mile of line for various conductor sizes, etc. These natural factors appear to vary widely in different localities. Where lightning might be more severe in one place, dust or salt spray may be more severe in other places. Only with reasonably correct records might proper emphasis be placed on corrective measures.

"These factors, once known, can be used as a tool in the economic design or improvement of a given circuit.

"To illustrate: A proposed load ten miles from an existing substation requires a degree of service considerably better than, let's say, a residential customer. To make the problem have definite dimensions lets assume that no distribution lines extend into the area of the new load. (This eliminates a very real and complicated factor of how to improve an existing circuit.) The problem: What degree of service continuity can the utility expect to render?

"It is assumed that we have outage records from which the following analysis for sustained and momentary outages may be made. (He presented a tabulation showing assumed outages per year of the various components of the line, the total being 2.49 outages per year for a total annual time of 169 minutes.)

"The estimate of average service to this customer would be, say, in the order of 3 interruptions per year totaling about three hours.

Should this degree of service appear to be inadequate, schemes for improving this estimate should consider:

(1) An express radial transmission circuit with substation at user's premises.

(2) Larger conductor at distribution voltage.

(3) Better than average construction with more attention paid to adequate wood insulation, tree clearances, adequate connections, etc.

(4) Better maintenance.

"This example is offered as one way of analyzing the predicted degree of service to a prospective user. Should requirements of the customer justify better service, degrees of improvement, at a cost, may be similarly estimated."

Underground troubles

Speaking for industry, R. M. Howe, chief utilities engineer for Magnolia Petroleum Company's refining division at Beaumont, Texas, told the group that underground installations had been a source of trouble even though such installations were restricted to service entrances, motor leads, etc.

"In past years," he said, "these underground installations have been made with lead covered cables using pot heads for terminations. Failures of lead covered cables were not uncommon, due to moisture either in the cable or the pot head. Generally this would be caused by electrolytic attack on the lead sheath or the expansion and contraction of the compound used in the pot heads. Because of these troubles, and for other reasons, we have now standardized on synthetic insulated cables for underground work. Also we do not use shielded cables except on our 13.8 kv system. This has led to the elimination of pot heads for terminations and also the elimination of their troubles. In the type of terminator used, the insulated conductor extends through this terminator and it doesn't make much difference if the water does get inside the terminator. So far, after about two years of using this type of terminator we have had no reported failures."

Another source of distribution system trouble mentioned by Mr. Howe was that of insulator leakage in contaminated areas.

"On overhead lines in the vicinity of cooling towers," he reported, "and in one case adjacent to a boiler blowdown stack, leakage of insulators has caused pin failures and damage to cross arms. We have tried special design insulators and higher voltage rated insulators with moderate success, but we feel that this hasn't been an adequate answer. This problem has been approached on recent installations by the use of aerial cables, taking care to install lightning arrestors at the point of change from open wire to cable. To date we feel this is the answer to our problem, although it is sometimes the more expensive answer."

M. L. Watts, assistant general foreman of electric department for Humble Oil and Refining Co., told the conference that his company's experience indicated principal causes of distribution troubles to be failure of hardware in corrosive atmospheres, failure of bolted type connectors in corrosive atmospheres, crowded and overloaded circuits, and hazards of open wire construction around operating units.

Referring to the troubles resulting from circuit crowding, Mr. Watts explained that congestion in some areas had reached the point where something had to be done to reduce the number of open wire lines.

Aerial cable favored

"The possibility of going underground was considered," he said, "but it was found that in most areas there were so many obstacles it would be necessary to go 10 to 12 feet deep to find a place to run these circuits. In places where it is possible to run underground it is necessary to encase all conduits in red concrete to protect against digging machines. In a number of cases circuits are installed underground for short distances to get into a unit or substation where it is best not to have open wire construction or cable. However, aerial cable has in most instances proved to be a satisfactory and economical solution to this problem.

"The first aerial cables installed were used for 13.8 kv power house getaways. These cables were single-conductor, each on a separate messenger, and they were all comparatively short. Later some three-conductor 13.8 kv feeder cables were run to a distribution substation. These cables were continuous from 13.8 kv switchgear to 13.8 kv/2400 volt transformer primary. The next step was aerial cable for the 2400 volt distribution system."

Short-circuit control

"Distribution system short-circuit control," was the title of a comprehensive discussion presented by G. G. Auer, of General Electric Co.

"The problem of short-circuit control," Mr. Auer said, "is one that demands certain considerations in the early planning stages of substation design. This is particularly true for heavy load density areas where substation sites are at a premium and economics dictate the use of large kva size transformers.

"With continuity of service on the distribution system a prime requisite, it is imperative that fault current magnitude or fault current duration be kept within safe limits to prevent conductor damage, to enable proper selective operation or co-ordination of protective devices and to be within the interrupting capability of automatic circuit reclosers and fuse cutouts.

"An approach to this problem of short-circuit control might be viewed from the standpoint of decreasing either the time required to interrupt fault current before it can be damaging or by decreasing the magnitude of current to a value within the capability of equipments and conductors involved. This is on the premise of damage or heat being directly proportional to I^2RT where "I" is magnitude of fault current, "R" is the resistance at the point of fault, and "T" is the length of time fault current is allowed to flow.

Current reduction logical

"On the basis of this, it would appear by first observation that it is most logical to reduce current rather than time where current is a square function. However, only by a better understanding of the various methods of control with their side effects, a complete economic analysis of these various methods, and a certain degree of good judgment based upon local conditions, can one determine the best approach to the problem."

As to reducing duration of fault current flow, Mr. Auer pointed out that with the advent of high speed trip breakers and reclosers the tolerable short-circuit current magnitude, which had originally been accepted in the range of 2500-3000 amperes, can now be accepted in the 5000-6000 ampere range. This tolerable upper limit is established by breaker-fuse co-ordination and not by conductor capability or interrupting capability of modern automatic reclosers and fuse cutouts. If circuit configuration is such that breaker-fuse coordination has no part in the problem, then current magnitude of 8000 or even 10,000 amperes may be tolerated.

Discussing the other alternative of reducing magnitude of fault current, he said that these could be reduced to safe operating values by several different methods such as:

(1) Additional impedance might be added to the substation transformer in its original design.

(2) A block of reactance might be inserted in the phase conductors in the substation at each feeder position.

(3) A block of reactance or resistance might be inserted in the neutral of the substation transformer connection.

(4) Substation design might consist of two or more small transformers with split secondary bus instead of one large transformer.

After discussing these several different methods in considerable detail, Mr. Auer concluded that "In those cases where short-circuit current must be limited, each of the various schemes presented has certain advantages and disadvantages. For example, phase reactors which are effective in limiting phase and line-to-ground current, will be cause for increased losses and regulation in the circuit.

"The application of neutral reactors will not affect voltage regulation but they will be cause for overvoltages on the unfaulted phases of a wye-grounded system during line-to-ground faults. The magnitude of overvoltage to be expected will affect the selection of lightning arresters to be applied.

"A very effective method of short-circuit control, particularly in very large substations, is the "split-bus" arrangement. Although this scheme is more costly from the standpoint of current limitation, the savings in dollars per kva of transformer capacity installed using large units plus the benefits of flexibility and improved service reliability warrant first consideration in the early planning stages of substation design."

Transformer yardstick

A system for the evaluation of the qualities of distribution transformers to provide a practical and realistic guide for the purchasing department was presented by J. B. Poston, superintendent of operations of transmission and distribution department, City Public Service Board, San Antonio, Texas.

"This method," Mr. Poston explained, "was based on the examination and testing of these particular distribution transformers with the idea in mind to find the particular qualities which either appeal to us in particular, or in general to all utilities, and which afforded a set of comparative facts whereby transformers could be rated, ranked, and purchased according to their relative merits.

Proved aid to purchasing

"This new method, naturally, was a great assistance to the Purchasing Department because it afforded to them an approved list of transformer suppliers. The adoption of this new method and its subsequent results would naturally entail for us a savings in money for various reasons. Specifically, the approved transformers would afford a savings in operating costs. They would be easy to install and maintain. They would essentially minimize service interruptions; they would afford higher revenue due to better voltage on the secondaries; and finally but not least in importance, customer relations would necessarily be improved.

"The evaluation consisted of electrical tests and mechanical inspections whereby a final figure of merit as to the quality of the distribution transformer was finally obtained.

"On all transformer characteristics both electrical and mechanical, a point system of grading was used with values assigned as follows:

"The transformer with the lowest annual operating cost due to losses was given a particular grade point of 3.5. The transformer with the highest losses was given a grade point of 1. A graph was then made using a plot of grade points versus the individual transformer's annual operating cost. A straight line was drawn from the 3½ point minimum cost point to the 1 grade point maximum cost point. This graph provides the means for picking off the intermediate grade points for the transformers in between.

"The electrical losses being accounted for, it then becomes necessary to attach grade points for the temperature rise test at the 140% load. A similar grading system was

used for this test with the transformer having the lowest temperature rise given the grade point of 3.5 and the transformer with the highest temperature rise given the grade point of 1. A similar graph was drawn to determine the grade point to be given the intermediate transformers.

"For the short circuit tests, three grade points were allowed for no noticeable effect on the transformer after the test. Two grade points were allowed when appreciable movement of winding was noticed but the transformer was still deemed OK for service. Zero grade points and a subsequent reject was applied to transformers showing damage that would prevent future operation of the transformer.

"Grading for the insulation tests allowed 3 points for a satisfactory test and zero points and a subsequent reject for a failure to pass the insulation test. The basis for grading the mechanical features was similar.

"The electrical characteristics were worth 60% of the total grade and the mechanical features were worth 40% of the total grade, making a perfect transformer worth 100%. The electrical and mechanical grade points for each transformer characteristic were converted to percentage figures by applying weighting factors.

"The final combined percentage of electrical and mechanical grades was then processed and the transformers were ranked 1 through 8 as to their total combined percentage grade. We have, hence, arrived at our appraisal of the distribution transformers and have ranked them according to our opinion of their net merit and worth on our system."

Computer application

How to use computers and modern techniques in distribution design and operation was the subject of a discussion presented by J. K. Dillard, manager, Electric Utility Engineering, Westinghouse Electric Corp., East Pittsburgh, Pa. He emphasized the need for a new approach in the handling of distribution problems and then discussed the new developments in computing such as advances in computing machines, progress in problem formulation, developments in automatic programming, and recognition of new applications in engineering.

He pointed out that a great number of problems in distribution engineering lend themselves to digital computer techniques, and he illustrated by taking a practical problem and showing how to write the equations, tabulate data, prepare the flow diagram or programming, coding, etc.

"You have often heard," Mr. Dillard said, "that one of the principal advantages of a high speed computer is that it frees the engineer from tedious, repetitious calculations and permits him to devote more of his time to true engineering. While this is true to some extent, it conveys the idea that the engineer simply has to tell the computer in conversational tones his problem, give it some data, and then engage in 'true engineering' until the computer comes up with its answer. Computers are getting smarter and will often write you a message telling where you made your mistake, but they have not yet quite reached the level of intelligence where they can replace the engineer's ingenuity and analytical ability. The computer still needs a good engineer to formulate the problem and the basic logic for its solution.

How to get started

"The way to get your own computer activity started is to select this engineer and give him a little training in computer techniques. I suggest you take one of your young system engineers. He will still be flexible in his thinking. Send him off to one of the short computer courses taught throughout the country. Or perhaps you can enroll him in a computer course at a nearby college.

"Maybe you think an easier approach would be to hire a computer-trained mathematician. It is true that many difficult problems can be cracked only by top system people and really skilled analysts and programmers working as a team. However, the time and effort required for a young engineer to become a skilled programmer is only a small fraction of the time required for him to get his engineering and mathematical education in the first place. So it follows quite generally that it is best for persons already skilled in the art to get the computer training which can be gotten in a few weeks.

"This is much better than trying to tell a mathematician all about your distribution or system engineering problem. This is not to say that skilled programmers may not be a great help in contributing more advanced computer methods and handling more skillfully the programming end of the work. But we are talking now about getting started. In this respect, I feel sure that it is better to have a few persons in system engineering work get familiar with computers in order to visualize their application to your problems. This is much better than doing it the other way around.

"Now your computer-trained systems engineer is going to find that many of your problems can be adapted to computer solution. So the second step in getting your computer activity started is to investigate the availability of computers in your own company or elsewhere. Many companies already have a medium-power computer in the commercial department. In the beginning, you probably wouldn't be able to keep a computer working full time anyway. Several power company engineering departments are already making good scientific use of computers when they aren't busy on business problems.

"The absence of a computer in your own company should not stop you. There are many computing centers where medium power and high-power computers are rented for a reasonable fee. Often system engineering assistance is also available to help with the analysis and programming work.

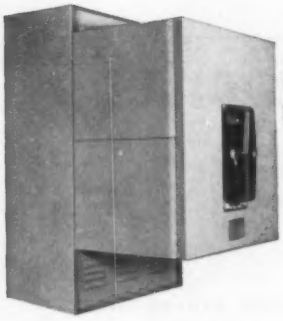
Performance problem first

"The last thing to do is to pick a problem to get started on. I suggest you start with an easy problem—perhaps one of the performance type. Later, add a little more complexity by trying a design problem. After a few of these, problems in optimization can be handled with ease. By this time, computers will be saving you so much time and money that you'll wonder how you ever got along without them!

"In summarizing, I would like to state in a few sentences the principal points I've tried to make here:

"First, loads on our systems are growing rapidly. Advances in distribution systems to supply them have not kept pace with achievements in generation and transmission. Because utilities have such huge sums invested in distribution, small economies percentage-wise can pay handsome dividends. We conclude that new approaches in

(Continued on page 108)



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NATIONAL ELECTRICAL WEEK
FEB. 9-15, 1958

A-5565

Record construction budgets reported by electric utilities for 1958

By J. W. McAfee
President
Edison Electric Institute

◆ THE ELECTRIC industry reached its 75th year in 1957, continuing during the year its record of remarkable postwar growth, and its constantly increasing service to American life, economy and defense.

In the past seven years, or less than one-tenth of its history, electricity generating capability and production have each increased by over 90 per cent, while sales have doubled. Average annual use of electricity per residential customer has increased by 1334 kilowatt-hours, the seven-year increase alone being greater than total use per residential customer only 11 years ago.

Generation in 1957

Generation of electricity by all components of the industry totaled 636 billion kwhr, an increase of 35 billion over 1956; sales of electricity reached 561 billion kwhr, an increase of 31 billion for the year; and average annual use per residential customer increased 195 kwhr to reach a total of 3164.

An additional 85 billion kwhr generated by industrial and railway plants pushed the grand total of electricity production in the USA to 721 billion kwhr during the year.

During 1957, approximately 8.5 million kilowatts of new generating capability were added to the nation's power lines, bringing the total generating capability to 135 million kw by the end of December.

1958 construction plans

The year 1958 begins with by far the largest construction program yet undertaken, including the scheduling of 16.25 million kw of new generating capability to go into service in 1958, as well as extensive construction of new transmission and distribution lines.

The installation of new generating facilities in 1958 will exceed the previous high record of 1955 by almost 4 million kw, and is about equal to the total net installations of the ten years between 1937 and 1947.

During the next decade it is estimated that more than 130 million kw of net generating capability will be added to the present total.

The additions already scheduled (or on order) for 1958 and later include nearly 40 million kw in steam plants and a little more than 5 million in hydro installations. Of this total of 45 million kw, 37 million are planned for installation by investor-owned companies. The remaining 8 million have been scheduled by the Federal government and other public agencies.

The progressive and dynamic qualities of the electric industry are demonstrated not only by its extraordinary service record, but also by its constant efforts to increase efficiencies and economies in generation and transmission of electricity, through continual pioneering in advanced engineering design, in its promotion of new uses for electricity, and in its promotion of the economic, social, and aesthetic progress of its service areas.

In the new field of nuclear power, activities of the electric utility industry showed continuous progress and significant expansion during the year. Two experimental plants in which electric utility companies are participating went into operation, and the large-scale Shippingport plant is now under test and full-scale operation is expected early in 1958. Planning and construction work on other large nuclear generation stations showed continuous progress. A detailed statement on atomic power progress appears later in this review.

Construction expenditures

Investment in electric plant and property of the investor-owned electric companies reached approximately $36.5 billion by the end of 1957. This figure has almost doubled in the past seven years.

During the past decade construction expenditures for generating, transmission, distribution and miscellaneous facilities have averaged $2.6 billion per year. The expenditures for construction in 1957 were $3.7 billion.

Construction expenditures budgeted for 1958 total $3.9 billion. Construction budgets are expected to average over $4 billion a year for the next several years, ranging up to $5 billion per year by the end of 1967.

Electricity sales

Of the total 561 billion kwhr sold in 1957 industrial sales accounted for 285 billion, as compared with 277 in 1956. Sales to residential customers reached 147 billion kwhr, an increase of 13 billion over the 1956 sales. Sales to commercial customers accounted for 95 billion kwhr, compared with 88 billion in 1956. Sales to other customers totaled 34 billion kwhr.

Gross revenue of the investor-owned electric companies totaled $8,047,000,000 in 1957. It was $7,521,000,000 in 1956. Net income was $1,405,000,000 in 1957, and in 1956 it was $1,346,000,000.

Taxes and other expenses

The investor-owned electric companies will pay $1,825,000,000 in Federal, state and local taxes for 1957, or 22.7 per cent of gross revenues, compared with $1,766,000,000 in 1956. Federal taxes were $1,100,000,000, and state and local $725,000,000. Wages and salaries, the next highest item in the expense account, totaled $1,420,000,000. This item was $1,335,000,000 in 1956. Fuel costs, the third highest item, were $1,390,000,000

Mr. McAfee is president of the Union Electric Co., St. Louis, Mo.

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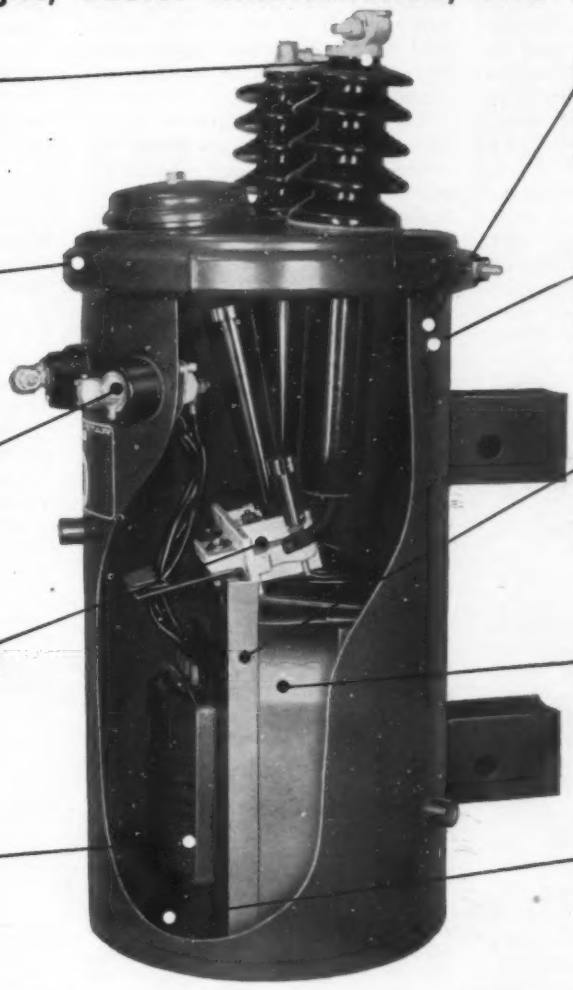

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H. K. PORTER COMPANY, INC.

DELTA-STAR ELECTRIC DIVISION

Porter Divisions: Cleveland, Connors Steel, Delta-Star Electric, Henry Disston, Leschen Wire Rope, Quaker Rubber, Refractories, Riverside-Alloy Metal, Vulcan Crucible Steel, W-S Fittings, H. K. Porter Company (Canada) Ltd.

during the year. Fuel costs totaled $1,236,000,000 in 1956.

Customers of the electric industry totaled 55,175,000 at the end of 1957, a gain of 1,180,000 over the preceding year. For several years over 98 per cent of occupied homes, both urban and rural, have been connected for electric service. Accrual of new customers is now largely determined by the establishment of new families and homes.

Residential and rural customers total 48.5 million at the end of 1957 and commercial and industrial 6.5 million. During the past ten years, residential and rural customers have increased by 15.4 million.

Average annual use of electricity in the home passed the 3000 kwhr mark early in the year, and at year's end was at the rate of 3164 kwhr. This was an increase of 195 kwhr over 1956, and well over the average increases of the past decade.

During the ten-year period 1947-1957 the average annual increase in the residential use of electricity was 173 kwhr, as compared with 63 kwhr in the preceding decade.

Electricity's contributions to better living continue to win widespread acceptance. Major factors in the steadily increasing use of electricity in the home have been the growing acceptance of an ever-widening range of electrical appliances by the residential consumer, and the rapid extension of home air conditioning.

Expanding consumption of electricity and the promotional character of electricity rates, combined with continuing improvements in operating efficiency, have enabled electric companies to reduce the cost per kilowatthour of electricity to the consumer. This has been achieved despite rate increases and the general rise in the cost of living during the postwar years. The average revenue per kilowatthour sold to domestic customers was 2.56 cents in 1957, a decrease of 17.2 per cent from the 1947 average of 3.09 cents. The average revenue in 1956 was 2.60 cents.

Rate increases

According to the records of the Edison Electric Institute, 499 applications for rate increases were made by electric companies to regulatory commissions from 1946 through the first eleven months of 1957. Of these, 440 were granted, 28 are pending action, 12 were withdrawn, and 19 were denied.

The 1957 record for the first eleven months shows 31 new cases before the commission, of which 9 have been granted and 22 are still pending.

It is obvious from the high percentage of rate increase approvals that commissions generally recognize the necessity for rate adjustments to insure the financial health on which continuance of adequate electric service depends.

Direct owners of electric utility companies—the stockholders—are estimated to number about 3.8 million, while nearly every American has an indirect financial interest in electric company operation. Included among the indirect owners are 106 million life insurance policyholders and an estimated 21.5 million depositors in mutual savings banks, as well as members, shareholders, or policyholders in various charitable and fraternal organizations, religious and educational institutions, foundations, etc., which are holders of electric company bonds.

Nuclear energy and the industry

At the end of the year over 100 electric utility companies, together serving a majority of the nation's electric customers, were actively engaged in various phases of nuclear power research, development and construction. Sixty companies were participating in the planning or construction of 13 nuclear power plants, of which two were completed and placed in operation during the year, one was essentially completed and undergoing testing, four were under construction, and the remaining six were in various stages of planning.

The seven plants either in operation or under construction are expected to have a combined capacity of more than 750,000 kw and involve expenditures, by the companies concerned, of over $285 million. The six projects in various planning stages will add substantially to both capacity and investment.

In addition to the 13 nuclear power plant projects, electric utilities are participating in four major nuclear power research and development groups. One group is carrying out research and development work in conjunction with a nuclear power plant project now under construction; two are undertaking major research and development projects looking toward eventual construction of nuclear power plants; one is undertaking a major research project in the field of thermonuclear energy. Additional electric utility companies are participating in a number of other study and research groups investigating various phases of nuclear power.

Last summer saw the initial operation of the first nuclear power plant designed to serve customers of a utility system. The experimental Santa Susana nuclear power plant, located about thirty miles from Los Angeles, is a joint effort of the Atomic Energy Commission, North American Aviation, and the Southern California Edison Company. It has a generating capacity of 6500 kw.

In the fall, electricity was generated from the first nuclear power plant wholly financed by industry. The Vallecitos experimental nuclear power plant, with a capacity of 5000 kw, is a joint project of the General Electric Company and the Pacific Gas and Electric Company.

The Shippingport nuclear power plant, the world's first large-scale plant constructed primarily for the production of electricity, was completed during the year and is currently undergoing testing. Full-scale operation is expected in the early part of 1958. This project, a joint endeavor of the Atomic Energy Commission, Westinghouse Electric Corporation, and the Duquesne Light Company, will have an initial capacity of 60,000 kw.

Large plants underway

Major construction work on the 100,000-kw Enrico Fermi Nuclear Plant being constructed by the Power Reactor Development Company and The Detroit Edison Company, which began in the latter part of 1956, continued during 1957. Major construction work on the 180,000-kw Dresden Plant, a project of the Commonwealth Edison Company and Nuclear Power Group, Inc., began in June of 1957. Site work on the 275,000-kw Indian Point plant of Consolidated Edison Company of N. Y., Inc., and the 134,000-kw plant of Yankee Atomic Electric Company be-

(Continued on page 107)

NEMA Wire and Cable Section discusses current problems

◆ B. F. ILSLEY, general manager, Wire and Cable Department, General Electric Company, was re-elected chairman of the Wire and Cable Section of the National Electrical Manufacturers Association at its recent 3-day annual meeting in Atlantic City, N. J.

The section also re-elected its two vice-chairmen—David E. Allen, vice-president-sales, Anaconda Wire and Cable Company, and H. B. Bassett, president, The Acme Wire Company.

Members were informed of plans being made for the proposed production of wire and cable technical handbooks. Under this proposal, NEMA would issue technical data on individual wire and cable products which would be based on industry standards. This information would replace similar technical data now included in individual company catalogs.

Among the highlights of the program was a discussion of the copper problem by Dr. Joseph Zimmerman, editor-in-chief of the Daily Metal Reporter. In his address, Dr. Zimmerman told his listeners that "there is nothing wrong with the copper market that a cut in production would not cure."

Copper problems

Copper prices, he said, have had a dizzy sinking spell that is unprecedented in the history of the industry, brought about partly from abnormally high prices that prevailed in 1955, and during the early part of 1956.

In commenting further on the situation, Dr. Zimmerman declared:

"These high prices, coupled with the incentive contracts that our Government offered to domestic and foreign mining companies to open mines and to increase the output at old ones, stimulated production to a point where it is running in excess of demand.

"The end-users of copper have been drawing heavily on their inventory so that their actual consumption is much larger than their purchases would seem to indicate. These inventories are now at a low point and are not being replenished because consumers, knowing that producers are carrying large stocks of unsold copper, feel safe in buying from hand to mouth.

"If the large copper producers were to curtail their output, it would have a profound effect on consumers' buying policy.

"As to whether the copper market has turned the corner, in view of the fact that in the past 16 months the price has dropped more than 50 per cent, from 55 cents a pound to about 26 cents a pound, the market is nearer the corner now than it has been. An adjustment in the supply position is all that is needed to push it definitely around the corner."

Survey discussed

In other key talks, the following pertinent points were made:

K. C. Crain, National Electric Products Corporation, and Chairman of the Section's new Packaging Committee—discussed a recent NEMA survey of types and sizes of reels being utilized in the industry. The survey, he said, revealed that the industry is using a tremendous number of types and sizes of reels, and that substantial economies could probably be realized if some type of standards program could be instituted.

Robert Merrill, retiring Director of Copper Division, Business and Defense Services Administration, and manager, Materials, Wire and Cable Department, General Electric Company—said it is good business for both the Government and industry to see that the flow of information between the two groups is directed by men who have a sound and thorough knowledge of industrial operations and activities. In commenting further, Mr. Merrill stated:

"A major activity of BDSA is concerned with preparing basic and special industry studies and reports. They involve a detailed analysis of the material requirements and principal component products of a basic industry. The objective, of course, is to make critical recommendations for the improvements and reorganization, if necessary of manufacturing methods within an industry.

"The objective of BDSA is to maintain control and give assistance to manufacturing facilities in obtaining needed materials only where necessary to accomplish military and atomic energy programs. These programs are carried on so as to avoid dislocation and hardship in the civilian economy."

M. W. Reid, industrial relations specialist, General Electric Company—told his listeners: "You will recall that the union very violently attacked the yellow dog contract, and I believe rightly so. Many years ago the yellow dog contract deprived men who worked under it of the right to join a union. It has been outlawed. Today's union shop contract deprives men who work under it of the right not to join a union. It should be outlawed.

"It is my firm conviction that unions will eventually accept the principle of voluntary membership as being consistent with their basic philosophy and as being in their long term best interest. This would result in a stronger labor movement, with the unions taking their rightful place as respected members of our business society. This will not come about of its own accord. We, as businessmen, must be willing to stand up and be counted as opposing a practice that could lead to the very destruction of our free society."

E. D. Jones, manager, Commercial Research Department, American Steel and Wire Division, U. S. Steel Corporation — explained

(Continued on page 70)

Understanding vectors as applied to apparatus connections

By E. B. Henry
Relay Engineer, Gulf Power Company
Pensacola, Fla.

Part 3

Watts and direction of flow

Since the principles involved in the application of vector diagrams to connections are the same for indicating, recording, or integrating equipment, the term "meters" as used here includes all three. The watthour meter is taken up first as a convenient illustration.

Probably the simplest three phase watthour meter is the three element watthour meter, with three current coils and three potential coils forming three pair of current and potential combinations, each combination operating upon a separate disc; all three discs are rigidly fixed to the same shaft.

Whether current lags or leads the voltage, the torque of the meter is proportional to the product of the current and voltage and the cosine of the angle between them. Further, for a given direction of power flow, the cosine cannot become negative; therefore, the watthour meter will continue in the forward direction, which is the direction of increasing registration, whether the current lags or leads the voltage.

The extremes are ninety degrees lead or lag. If the load reaches either extreme, the watthour meter shaft stops rotating. If the nature of the application is such that the power flow sometimes reverses its direction the direction of rotation of the watthour meter will reverse unless provided with mechanical means of prevention.

Please note and bear in mind that "a direction," "the direction," or simply "direction" of flow means positive or actual direction, for there must be a direction of power flow although alternating current power is being considered.

For an illustration of the effect of direction upon a meter, refer to Fig. 11. Let it first be assumed that A is supplying power to B, causing B to operate as a synchronous motor. The power received by B flows through the watthour meter in the direction L to R; when the current at L is at its peak, voltage at L is also at its peak and such is the relation for other points of the current and voltage waves and the shaft of the watthour meter rotates forward. For convenience, meter and relay elements are considered as having terminal polarity. Terminals of the same polarity are those that produce forward rotation when current and potential at this pair of terminals are in phase or within requisite limits.

In Fig. 11, the meter terminals of the same polarity are on the same side of the meter. Now if the prime mover of A is cut off and B is driven by its prime mover, the power flow will be reversed. A will continue to rotate in the same direction as before, but will be receiving power. At the meter, the current attains its peak at R at the instant that the voltage attains its peak at L. This relation, opposite from the initial one, causes the meter to reverse its direction of rotation.

Reactive volt-amperes (vars) and direction of flow

The direction of flow of power is, quite obviously, from the generator into the load. In the usual case the power is delivered to the load at a different voltage from that generated. The voltage is stepped up and then stepped down by means of transformers interposed be-

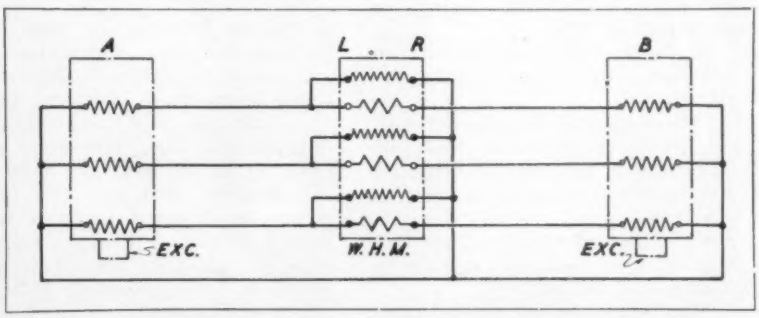


Fig. 11—Diagram of generator supplying power to synchronous motor.

Night view, showing the "Leisure House," customer-service building, center of Tampa Electric's active "Live Better Electrically" program. The simplicity of HAPCO's Venetian Column design blends with the modern architecture and maintains a feeling of spaciousness in the well planned parking area.

For Tampa Electric Company...

Trim, modern appearance of HAPCO Poles and Brackets complements "Live Better Electrically" program

By day, the spacious parking area at Tampa Electric Company accommodates office employees and visitors. At night, mercury vapor lamps mounted on HAPCO Poles and Brackets light the way for customer meetings and demonstrations at the "Leisure House." Here, through scheduled demonstrations by trained Home Economists, supplemented by displays of the latest electrical appliances, lighting and air conditioning, Tampa residents truly learn how to "Live Better Electrically."

Although atmospheric corrosion is a major problem in coastal or industrial areas, long service life can be expected from the 24 HAPCO Poles and Brackets here, since both are made from corrosion resistant aluminum. After being "spun" from aluminum alloy, HAPCO Poles and Brackets undergo special heat treating for maximum structural strength. Aluminum's attractive silver grey finish requires no initial or maintenance painting, and lightness in weight means additional savings in transportation and erection costs.

In the complete HAPCO line of Standards and Brackets are designs for all types of outdoor lighting installations. For more information, write to Hubbard Aluminum Products Company, 6301 Butler Street, Pittsburgh 1, Pennsylvania.

LIVE BETTER ELECTRICALLY

Tampa Electric's new headquarters are located on Dale Mabry Highway, midway between the northern city limits and Gandy Boulevard. At night, this heavily travelled, seven mile section of U.S. Route 92 comes brilliantly alive with light from 259 mercury vapor luminaires mounted on 208 HAPCO 8-foot Brackets and 51 HAPCO 6-foot Brackets.

HUBBARD ALUMINUM PRODUCTS COMPANY
Division of Hubbard and Company
Pittsburgh 1, Pennsylvania

tween the generator and the load.

To bring about transformation and ultimate motion, two components are required. One of these components is a product of the voltage and the component of current that is in phase with the voltage; its unit of measurement is the watt.

The other component is the product of the voltage and the quadrature component of current, which, at the terminals of consuming equipment, always lags. The two components of current mentioned are not separate and distinct; they comprise one current, which lags the voltage by an angle whose cosine is the power factor and whose sine is the reactive factor.

However, these two components may be treated as though separate entities since the results produced by them support this concept. The component of current that lags the voltage by ninety degrees is the reactive component; its product with the voltage is called "reactive power;" the applicability of this term is questionable, but it has come into general use and probably causes only a minor amount of misunderstanding. However, since its use in the same context might also demand a qualifying term for the in-phase component, the adjective alone will be used. The use of the singe word "reactive" to denote the product of the voltage and the quadrature component of current is common practice in office and field and is therefore readily understood.

When concerned with the direction of flow of reactive, one only needs to consider the fact that it performs a necessary function and that function is the magnetizing of equipment. To equipment requiring reactive it makes no difference whether the supply comes from a generator, a "synchronous condenser," a group of static capacitors, or a combination of these. Neither can a meter distinguish between vars supplied from rotating or static producers of reactive.

If a load is predominantly capacitive, it is a producer and therefore the reactive flow is away from it, if a load is predominantly inductive, it is a consumer and therefore the reactive flow is toward it. The terms "capacitive" and "inductive" apply to characteristics of the load, not to the reactive produced or consumed by it. For illustration refer to Fig. 12 and 13, and Cases I and II above.

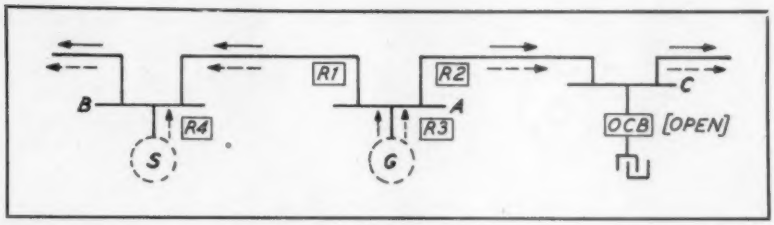


Fig. 12—Diagram illustrating reactive flow as described in Case I.

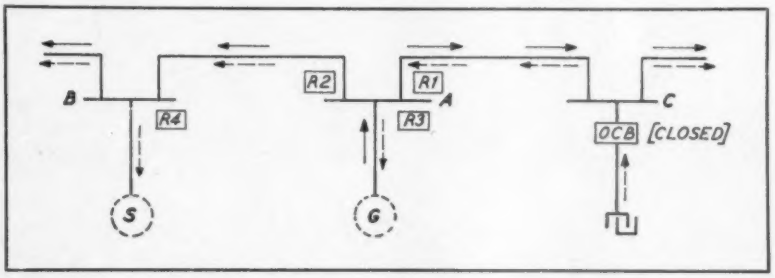


Fig. 13—Diagram illustrating reactive flow as described in Case II.

Case I—At station A, power from the generator is flowing in both directions as shown by the solid arrows; also reactive from the generator is flowing in both directions; as shown by the dotted arrows.

At station B, reactive from the synchronous condenser is flowing beyond into the system. At station C, the O.C.B. is open and both power and reactive are flowing through the station.

R1 and R2 are zero center reactive indicators or recorders of the transmission system; R3 and R4 are those of the generator and the synchronous condenser. All pointers are toward the right corresponding to the direction of the dotted arrows. (In some systems R3 and R4 would be connected to indicate to the left, the transmission voltage bus being the only reference; the actual direction of the flow of reactive should not be confused with the plus and minus signs sometimes used as symbols in "IN" and "OUT" with respect to a given reference point).

Case II—With system demands for power and reactive unchanged, the O.C.B. at C is closed, connecting the capacitor bank to the system; further the rating of the capacitor bank is greater than the demand from G and S at that time. The capacitor bank has no means of varying its output. The result is a momentary increase in voltage affecting stations A and B. The voltage regulators at A and B weaken the fields of G and S until these two machines absorb the excess reactive.

At meters R1 and R3, the direction of flow of reactive is opposite to that of the power. The combined load at B remains predominantly inductive, while the combined load at C has become predominantly capacitive.

Wire and cable

(Continued from page 67)

proposals to start NEMA wire and statistical programs based on sales to industries. Such a program, he stated, will make it possible for industry forecasting to be undertaken.

George Albiez, president, National Association of Electrical Distributors — discussed the wire and cable industry from a distributor's viewpoint. He pointed out the inventory problems created by the substantial number of types of wire and cable insulations available, adding that many of them are intended for similar applications.

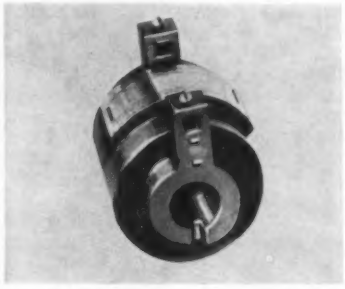
Harry Leopold, John A. Roebling's Sons Corporation, discussed activities conducted by the Section's Marketing and Statistical Committee during the last two years; Richard Steiner, assistant general sales manager, General Cable Corporation, reviewed efforts being made to refine present NEMA statistics and proposals to institute geographical statistical programs, and A. Wacker, vice president, General Cable Corporation, reported on a new type of magnet wire package.

Notes on new utility equipment

Molded transformer for low burden—high accuracy needs

INTRODUCTION of a new line of molded transformers using epoxy resins, for indoor or outdoor metering applications has been announced by the Standard Transformer Co., of Warren, Ohio. These Type CPE units are recommended for use with watthour meters or other applications where exceptionally high accuracy at low burdens is required.

The units are interchangeable with current transformers, meeting dimensions of EEI meter and service



committee specifications for 600 volt transformers. They meet all other association standards in respect to accuracy.

The CPE is a windowtype transformer, but can be supplied with round or flat bar primary conductors, also with mounting brackets for switchboard use.

For additional data, ask for item U-101, using the coupon on page 87.

Welded construction aluminum bus fittings

DURAWELD fittings, for welded construction of aluminum bus, are the latest achievement in substation connectors by the Anderson Electric Corp., 700 North 44th St., Birmingham, Ala.

DuraWeld fittings promise durable, "trouble-free" connections, save time and steps in bus fitting and are less expensive than bolted fittings, said C. E. Bitzer, vice-president at Anderson.

"Designed for ease of welding and fitting of parts, we believe DuraWeld fittings are a considerable advance in fittings for welded construction," he explained. "They eliminate the need for accurately cutting and fitting bus together, as the connectors serve as 'welding jigs' for proper alignment and construction.

Once a DuraWeld fitting is properly welded in place, it insures a permanent neat, trouble-free con-

nection, because the fitting becomes an integral part of the bus. The smooth, rounded surfaces of DuraWeld connectors allow the welder to run a continuous bead without having to strike another arc in the same area. They have no projections or sharp corners as potential trouble spots for corona.

"The new welded fittings are much more economical than bolted fittings," Bitzer added. "Prices average 20 to 70 per cent less than bolted fittings." DuraWeld fittings are recommended for big jobs which justify welding. The new fittings, a pioneer product in the new conception of welding in substation connections, will supplement Anderson's regular line of bolted connections," Bitzer said.

For additional data, ask for item U-102, using the coupon on page 87.

Silicone insulated current transformer

A NEW 8.7-KV silicone-molded current transformer (Type SM-8.7) for indoor metering and relaying applications is available from the Westinghouse Electric Corp., Box 2099, Pittsburgh, Pa.

In standard current ratings from 5 to 800 amperes, it replaces the previous standard Type CT-8.7 units. The transformer has a rating factor of

1.5 at 30 degrees C in all ratings from 5/5 to 600/5 and 1.33 for the 800/5 unit. It is in the 0.3 accuracy class for all metering burdens and meets all ASA and NEMA standards.

The silicone-base insulation is molded to the coil assembly, completely sealing it from moisture and air, and is unaffected by temperature changes. The material is also highly resistant to abrasion and rough handling.

The new transformers weigh approximately 25 pounds and can be mounted in any position—on wall, column, ceiling or floor.

Primary terminals are silver plated and added flexibility in making connection is possible through use of a slotted bolt hole. A transparent cover permits visual inspection of the low-voltage terminals.

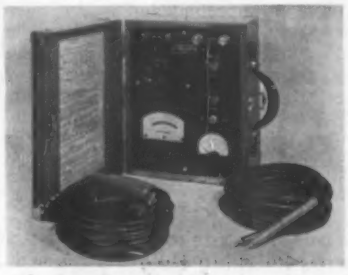
For additional data, ask for item U-103, using the coupon on page 87.

Highly accurate microhm resistance measurements

THE MICROHM METER available from the J. W. Dice Co., Englewood, New Jersey, is specifically designed for making highly accurate resistance measurements in the microhm range. It is a service type instrument but with laboratory accuracy.

Abnormally high resistance in cable joints, bus bar connections, limiters and fuses, windings in transformers and rotating equipment are detected.

Condition of circuit breaker contacts can be checked without disassembly of the breaker—by connecting the Microhm Meter to the top terminals. Every breaker has a "normal" contact resistance when the contacts are in good condition. Carbonized or burned contacts, brok-



en strands or leaves in jumpers, misaligned castings or any other trouble causing abnormally high resistances can be readily detected.

Total resistance of the main and auxiliary contacts is checked with the breaker closed. With the breaker unlatched and the main contacts parted slightly, the resistance of the auxiliary contacts can be measured. On large breakers the Microhm Meter can pay for itself if just one dis-

assembly for visual inspection is eliminated.

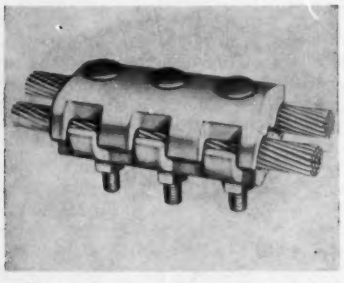
The operation of the Model 151-S Microhm Meter is extremely simple. The circuit employed is that of a modified Kelvin bridge. Current leads are connected on each side of the part to be measured and the current is adjusted to the proper value by a rheostat on the instrument panel. Normal test current for direct reading in microhms is 10 amperes.

For additional data, ask for item U-104, using the coupon on page 87.

Parallel grove clamps sizes cover #6 through 477 MCM

THE A. B. CHANCE Co. of 210 North Allen St., Centralia, Mo., is offering a new line of two- and three-bolt parallel groove clamps that covers #6 through 477 MCM in just four clamp sizes. Cast of high-strength, heat-treated aluminum alloy, for use on ACSR or all-aluminum conductors, they are designed to withstand high mechanical and electrical stress.

These thick-bodied clamps have the massive construction and high



resiliency to stay tight under all load and temperature conditions. Clamp body is contoured to make the bolts self-aligning and self-centering—to apply equal pressure on both main and tap lines. Conductor grooves support and contact all outside conductor strands.

"Bright dipping" and a coating of compound assure low-resistance contact surfaces. Available with either aluminum or steel hardware, these clamps meet applicable NEMA and REA specifications.

For additional data, ask for item U-105, using the coupon on page 87.

Apparatus packaging saves handling time

HEAVY corrugated cardboard, pressboard and polyethylene envelopes have outmoded traditional wooden crating for DMB air circuit breakers at Federal Pacific Electric Company's Eastern Switchgear Division, Scranton, Pa.

"DMB air circuit breakers," Armand J. Bisignani, Jr., switchgear products sales manager, reported, "are now transported in polyethylene bags containing a small amount of

moisture-absorbent silica gel. Shipment is made in tough cardboard cartons or reinforced pressboard boxes attached to disposable wooden pallets. This new package design assures factory-fresh, dust free delivery and storage of equipment with the elimination of humidity damage to vital parts. It also provides appreciable cost savings for us and for our customers."

The savings that he referred to were summarized as a reduction of shipping weights and materials handling and storage costs both at point of shipment and on the job site. He estimated overall savings of shipping expenses at twenty per cent compared with the older crating methods.

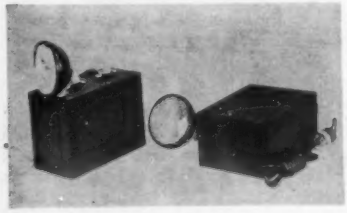
Federal Pacific air circuit breakers now delivered by the new packaging method include those for industrial, commercial and utility applications and for electrical distributor stocks. These breakers are rated at 40 to 1600 amperes, continuous, with interrupting capacities from 15,000 to 75,000 amperes.

One to three ounces of silica gel are placed in shipping units whose gross weights range from 90 to 410 pounds.

For additional data, ask for item U-106, using the coupon on page 87.

Battery powered standby and emergency lights

PORTABLE SURELITES are recommended for power substations, assembly rooms, PBX switchboards, surgery rooms, first aid or any location where power interruption could cause loss of control, panic, or accidents. The Surelites are available from the Clean Sweep Co., 6534½ Whittier Blvd., Los Angeles 22, Calif.



A hand-carry standby and a shoulder-carry emergency light are equipped with a sealed beam lamp operated by a multiple cell dry battery.

Model DA, the standby, uses an 800 candlepower floodlight as standard which will furnish 3 hours of continuous light or 4 hours if used intermittently. It comes equipped with 6 foot 3-wire rubber covered cable, ground cap and adaptor to plug into 115 volt light circuit as standby. Lamp rotates for vertical elevation.

Surelite does not operate while AC voltage continues but an interruption of line voltage automatically turns Surelite on to provide illumination during the power failure. Resumption of line voltage automatically disconnects the battery and Surelite turns off. The sealed beam operates from the battery only and the battery is not recharged.

Model D is a portable lamp only, without the standby feature but with shoulder strap and 40,000 c.p. spot which furnishes 2½ hours continuous or 3½ hours intermittent light as standard. 800 c.p. flood and 40,000 c.p. spot lights are interchangeable in either model.

For additional data, ask for item U-107, using the coupon on page 87.

Revolutionary meter design permits "on-line" accuracy

A NEW single-phase watthour meter with a revolutionary stator design permitting "on-line" accuracy up to 200 amperes, has been announced by the General Electric Co., of Schenectady 5, N. Y.

Called the I-60, it is a 30-ampere, 240-volt, three-wire single-phase model, with an overload capacity of 667 per cent.

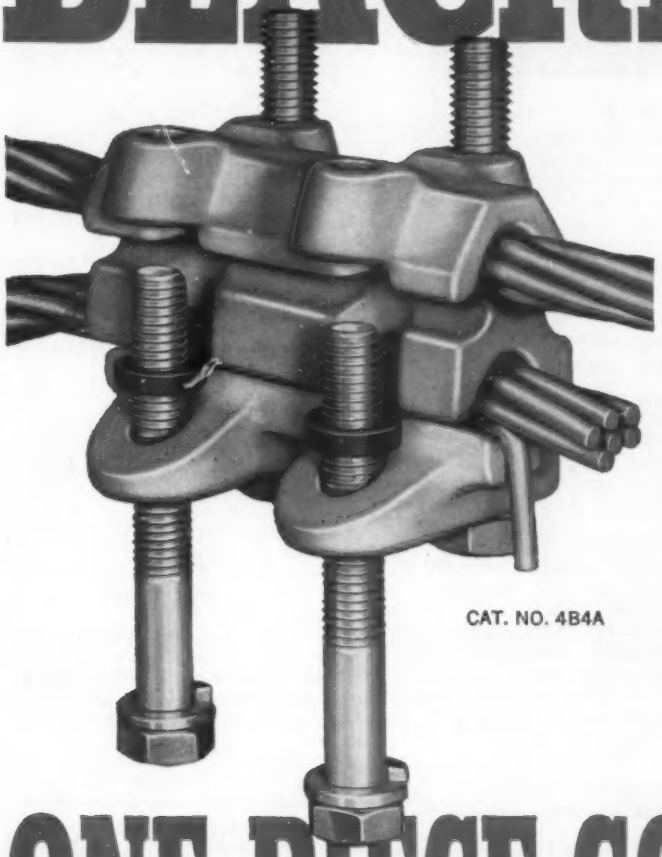
The I-60 was developed to provide a meter for all loads up to 200 amperes, equal or better in performance than existing single-phase meters, and at a cost no greater than available Class 100 types.

"For some time," Donald E. Craig, Meter Dept. manager, stressed, "there has been controversy concerning Class 100 versus Class 200 meters. GE is not taking either side, nor do we intend to promote our I-55 (Class 100) or the new I-60 (Class 200) as the industry 'standard.' In the two years since its introduction, the I-55 has been accepted as an outstanding Class 100 meter and we are certain the I-60 will be recognized as a superior Class 200 meter. We leave it to the electric utilities, themselves, to make the choice."

Load curve of the I-60, Craig said, is "as close as anyone has come to on-line accuracy over such a wide load range in a single-phase watthour meter. Accuracy is not only 'right on' at the full and light load

It's New! Installs quicker...easier

BLACKBURN



CAT. NO. 4B4A

It's here... a heavy duty one-piece 4-bolt connector with all the electrical and mechanical advantages of a U-bolt connector... yet much easier to install.

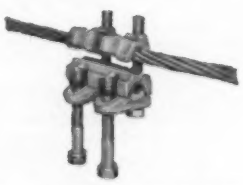
No bothersome nuts, washers, housings, spacer to take apart and assemble. Just three quick, easy steps and installation is completed.

Housings are of non-copper-bearing aluminum alloy. Spacer of soft aluminum pig protects conductor, aids conductivity. Spacer treated with heavy coating of oxide inhibiting compound. Hardware is high strength aluminum alloy completely alumilited to prevent seizing.

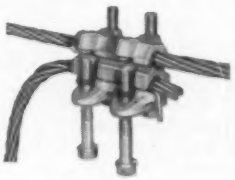
WIDE RANGE...
Accommodates conductors—2/0 to 397.5 ACSR—3/0 to 477 MCM.

ONE-PIECE CONNECTOR

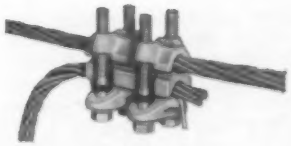
HERE'S HOW EASY THE NEW 4-BOLT CONNECTOR IS TO INSTALL



Unscrew the two free bolts contained with neoprene washers and hang over main.



Insert tap wire.



Tighten and you have the ultimate in a good connection.

Available through electrical wholesalers everywhere

JASPER BLACKBURN CORPORATION
1525 Woodson Rd., St. Louis 14, Mo., WYdown 3-9430

test currents of 30 and 3 amperes respectively, but is still on at 15 and 1.5 amperes, the test currents for a 15-ampere meter."

At the heavy load end of the curve, Craig said, the I-60 is within three-quarters of one per cent at a full 200 amperes. An entirely new stator design makes the light load accuracy of the 30-ampere I-60 comparable to the performance of a 15-ampere meter.

In the new stator, the conventional combined voltage and current electromagnet is replaced with a pair of magnetically-isolated electromagnets, one for voltage and one for current.

Magnetically separated magnet circuits overcome the compromises formerly necessary in core design, material selection, and current coil configuration. This new construction minimizes some of the shortcomings found in present day meters—including potential loses, torque reductions, coil balance errors at heavy loads and a low power factor.

The butyl-insulated current coils are free to move on the current laminations without affecting meter calibration because of the unique design of the stator. This eliminates calibration errors resulting from gap distortion caused by socket forces transmitted through the current leads.

The I-60 features magnetic suspension of the rotor with all the attendant benefits—including elimination of bearing maintenance.

Other design features are high corrosion resistant parts, retarding magnets die-cast into the frame, one-piece molded base, butyl-molded potential coils and lightning surge relief gaps. The I-60 meter will operate accurately over the wide range of ambient temperatures encountered on meter installations.

Other important characteristics of the I-60 include: starting watts average about 22 and the potential coil watts loss is only 1.1; meter torque is 40 gm mm; speed at 30 amperes is 16 2/3 rpm; watthour constant is 7.2; the register ratio is 13 8/9, and the temperature rise at 200 emperes is only 52°C.

For additional data, ask for item U-108, using the coupon on page 87.

Dead end conductor clamp accommodates large hooks

THE LARGE and distinct pulling eye of the DF-10 dead end conductor clamp manufactured by the Barron Bethea Co., Inc., P. O. Box 2202, Birmingham 1, Ala., will accommodate the largest of hooks.

Holding strength of the clamp was designed to be greater than the conductor it fits. The keeper is not reversible. To reduce the number of movable parts and to facilitate installation the keeper is "peened" securely to the U-bolt.

Overall dimensions are approximately 4½" by 4½". Clamping range

is from .160 to .522 inches, and clamp has a rated strength of 12,000 lbs. Designed for use on ACSR conductors from 4 to 1/0, inclusive, also, copper from 6 to 4/0, as well as copperweld and amerduct.

For additional data, ask for item U-109, using the coupon on page 87.

Non-abrasive surfaces on secondary racks

ELECTRO-FORGED secondary racks, being offered by Line Materials Industries, McGraw Edison Co., Milwaukee 1, Wisc., are two-, three-, or four-wire types. They are available in either extended or non-extended back styles.

The L-M electro-forged racks are lightweight, yet sturdy for supporting high dead-end and cantilever loads. Their oval-shaped legs provide broad non-abrasive surfaces for safe wire stringing. They are hot-dipped galvanized to resist corrosion.

For additional data, ask for item U-110, using the coupon on page 87.

Plastic coating for clamps permits quick identification

REPLACEMENT of the cellulose acetate covering of its pre-filled clamps with a superior coating of clear plastic, molded to the clamps by the Auto-Vac process, has been announced by the Jasper Blackburn Corp., 25 Madison St., St. Louis 6, Mo.

This new clear plastic coating permits quick recognition of the style of clamp (i. e. aluminum to aluminum, copper to copper). Also, catalog number and wire range can be seen instantly, thus eliminating the need for the identification tag previously used.

The new plastic coating is easy to remove even with cumbersome lineman's gloves. And the pre-filled feature serves as an insurance policy in that a lineman can not forget to use an inhibitor.

In addition to its "see-thru" advantages, the plastic coating gives a better overall seal for the factory-applied Contax. As a result, none of the compound is lost through leakage, and storage life is longer. The pre-filled feature also is a cleaner operation than applying an inhibitor separately.

For additional data, ask for item U-111, using the coupon on page 87.

Transformer service manual for operation and maintenance

A COMPREHENSIVE transformer service manual for operating and maintenance personnel of utilities and industries has been published by Allis-Chalmers. Manufacturing Co., 938 S. 70th St., Milwaukee 1, Wisc.

The 4-1/2 by 7-inch loose-leaf 150-page booklet covers every phase of transformer operation and maintenance. Fully illustrated, the manual is divided into three sections—general information, construction details and industry standards.

The manual can be obtained on request on company letterhead from Allis-Chalmers, at a nominal charge to cover cost of maintaining a card index system for keeping the material current.

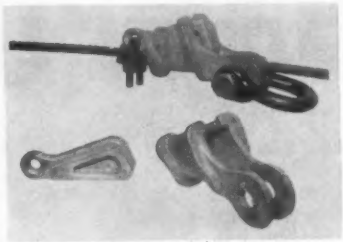
For additional data, ask for item U-112, using the coupon on page 87.

Continuous cable clamp holds power lines under tension

THE NEW FITTING available from Sauerman Brothers, Inc., 620 South 28th Ave., Bellwood, Ill., provides a quick way of attaching a load to a continuous cable.

The clamp is being used in the field to hold power lines under tension. Its other uses include rigging, car pulling, barge moving, and other jobs where a load must be connected to a line.

The three-part fitting consists of a wedge clamp, wedge, and cable clip. To attach the load to the cable, the wedge clamp is placed on the cable with the small end in the di-



rection of the cable pull. The wedge is then inserted. The cable clip passes through the eye of the wedge and locks it in place. A clevis and pin are frequently used to attach the load to the clamp.

Sauerman continuous cable clamps are manufactured for rope sizes from 3/8 to 1 1/4 inches.

For additional data, ask for item U-113, using the coupon on page 87.

Know the law

by Arthur L. H. Street

Court holds contractor may supply needed plans

◆ LIMITATIONS upon the power of a state legislature or municipal authorities to impose burdens upon those engaged in electrical contracting are intimated by a recent decision rendered by the United States District Court, District of Columbia in the case of Electrical Contractors Association of the District of Columbia v. McLaughlin et al, 153 Fed. Supp. 653.

The court declared to be void a regulation adopted by the Board of Commissioners of the District, to the effect that an application for a permit for proposed electrical installations, must be accompanied by plans and specifications prepared and signed by a professional electrical engineer registered in the District—in all cases where current carrying capacity exceeds 200 amperes or electrical potential exceeding 240 volts.

First, the court reviewed the history of electrical construction regulations in the District, beginning in 1927 and mentioned that in 1944 Congress authorized the Board of Commissioners to adopt and promulgate regulations governing the electrical industry in the District, and in April 1946, the Commissioners promulgated the Electrical Licensing and Bonding Regulations, which have been amended from time to time, and which are presently in full force. These Regulations have as their purpose the "* * * practical safeguarding of the public and the District of Columbia from hazards involved in the installation, maintenance, or repair of work, apparatus, equipment, fixtures and appliances coming within the scope of the Acts of Congress * * * " And the scope of said "* * * regulations is limited to electrical work within the purview of the Electrical Code, D. C."

An examination of these regulations reveals that they not only rigidly control the licensing and bonding of electrical contractors and the various categories of electricians, but also that an applicant for a license must demonstrate his qualification and fitness by displaying a thorough knowledge of the Electrical Code, through written examinations which include such questions, diagrams, etc., as are sufficient to thoroughly demonstrate that the applicant has the experience and knowledge of regulations and construction methods considered necessary to engage in the class of occupation for which he has filed a license application.

Master electrician must pass examination

Another regulation requires that a master electrician pass an examination including "A practical knowledge of the Electrical Code and regulations applicable to electrical installations, wiring methods, types and current carrying capacity of conductors, conductor and equipment protection, standard wiring systems and diagrams."

This regulation also requires applicant to demonstrate ability to comprehend and interpret electrical wiring plans and drawings, to maintain electrical installations, and to repair apparatus, equipment, fixtures and appliances according to the Electrical Code and established standards.

"It is therefore apparent," says the court, "that the Commissioners * * * have adopted and kept in force regulations to protect the District and the public by granting licenses to practice the electrical trade or business only to those who are able to demonstrate their qualifications and fitness, and who must furnish substantial bonds, to protect District and the public."

Since at least 1927, the District Electrical Code had contained these provisions:

"1143. Permits for Work Inside and Outside Buildings—

"a. Plans and specifications showing in detail the electrical system to be installed in any building shall be submitted in each case as a part of the application for permit, if so required.

"b. Such plans and specifications shall be submitted as a part of every application for permit to install electrical work in any apartment house, hotel, theater, or other place of public assembly."

One of the purposes for the promulgation and adoption of the foregoing Section was to enable the Electrical Division of the District of Columbia Building Department to understand applications for electrical permits in order to ascertain whether such proposed work was designed to be done in accordance with requirements of existing electrical code regulations.

Permit application must contain load estimate

In 1950 Congress passed two laws, one regulating the practice of architecture and one regulating engineering in the District.

In October, 1956, the Board so amended Section 1143 as to read:

"1143.1 Plans and computations of estimated loads showing in detail the electrical system and all equipment to be installed in any building shall be submitted as part of the application for a permit where required. * * *

"1143.2 Plans and computations shall be prepared and signed by a professional electrical engineer, registered in the District of Columbia, as provided in the Professional Engineers' Registration Act of September 19, 1950, Public Law 789 [64 Stat. 854] for any proposed installation in which the capacity is in excess of 150 kva or 600 volts.

"The above excess of 150 kva when applied to additional loading of an existing installation of any size refers only to that portion being added, except where the added loading necessitates increasing the size of the existing installation to above 150 kva."

Court holds Code revision not in public interest

The court observes: "It is apparent that the proponents of the

(Continued on page 102)

New, revised estimating tables continued in this issue

A NEW SERIES of estimating tables, completely revised in the light of more recent jobs and experience, are presented in this issue and will appear from month to month in forthcoming issues. These electrical estimating data sheets cover labor only and are arranged alphabetically with the basic material headings as a title for each tabulation.

Labor units given in these tabulations are based on a minimum of interference during work progress. The averages listed do not provide for abnormal job conditions, and any such abnormal conditions will require adjustments by the user, based on his experience.

The work units covered by each table are composed of one or more separate but closely related operations necessary for the complete installation of a particular basic item of electrical equipment. These operations associated with the basic material are described at the bottom of each table.

Most of the electrical estimating tabulations follow the same form. Column 1 at the left shows the size of the material to be installed. The second column from the left gives the time required to install the material, and it should be noted especially that this "productivity" column may be based on individual units or in the case of cable or conduit on units of 100 feet or 1,000 feet. The abbreviations "Ea." for each, "C" for hundreds, and "M" for thousands in Column 2 indicate the basis of the labor hours.

Columns 3 to 13, from the left, give the actual labor costs in dollars per unit of installation, at various hourly wage rates.

When calculations are being made for an hourly wage rate that doesn't correspond to any of the rates listed in Columns 3 to 13, the user may multiply the number of hours in Column 2 by 100 and this will give the labor cost based on an hourly wage rate of $1 per hour. By multiplying this by the hourly wage rate that actually applies in the user's locality, the exact labor cost of the operation may be obtained. Labor costs obtained in this way will be for units, hundreds of feet, etc., as given in heading of Column 2 of the table.

The labor units covered by the tables represent direct job labor costs and do not include delivery of material to site, engineering, estimating, or any other indirect cost.

As will be noted, some of the electrical estimating tabulations to be given will be for independent operations, such as excavating, backfilling, etc. These are included for use in preparing estimates on work of a special nature not covered under a specific table heading.

Tables will appear in alphabetical order.

METALIC CONDUIT FLEXIBLE -- WOOD RESIDENCES

CONCEALED
NEW WORK

CONDUIT SIZES	HRS. "C"	LABOR COST INSTALLED PER FT. AT FOLLOWING RATES										
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
1/2"	4.4	.055	.066	.077	.088	.099	.11	.121	.132	.143	.154	.165
3/4"	5.2	.065	.078	.091	.104	.117	.13	.143	.156	.169	.182	.195
1"	6.3	.079	.095	.11	.126	.142	.158	.175	.189	.205	.221	.236
1 1/4"	6.9	.086	.104	.121	.138	.155	.173	.19	.21	.224	.242	.259
1 1/2"	7.7	.096	.116	.135	.154	.175	.193	.212	.231	.25	.27	.289
2"	9.2	.115	.138	.161	.184	.207	.23	.253	.276	.299	.322	.345
		BRICK RESIDENCES										
1/2"	4.9	.061	.074	.086	.098	.11	.123	.135	.147	.159	.172	.184
3/4"	5.7	.071	.086	.10	.114	.128	.143	.157	.171	.185	.20	.214
1"	6.9	.086	.104	.121	.138	.155	.173	.19	.21	.224	.242	.259
1 1/4"	7.6	.095	.114	.133	.152	.171	.19	.209	.228	.247	.266	.285
1 1/2"	8.4	.105	.126	.147	.168	.189	.21	.231	.252	.273	.294	.315
2"	10.2	.128	.153	.179	.204	.25	.255	.281	.306	.332	.352	.385

E-102-B

LABOR: Includes handling material at site, drilling access holes, cutting & installing flex, strapping attaching at terminus.

1-58

CONDUIT FLEXIBLE METALIC - WOOD WAREHOUSES

SURFACE MOUNTED

CONDUIT SIZE	HRS. "C"	LABOR COST INSTALLED PER FT. @ FOLLOWING RATES										
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
1/2"	4.8	.06	.072	.084	.096	.108	.12	.132	.144	.156	.168	.18
3/4"	5.6	.07	.084	.098	.112	.126	.14	.154	.168	.182	.196	.21
1"	6.8	.085	.102	.119	.136	.153	.17	.187	.204	.221	.238	.255
1 1/4"	7.4	.093	.111	.13	.148	.167	.185	.204	.222	.241	.259	.278
1 1/2"	8.3	.104	.125	.145	.166	.187	.208	.228	.249	.27	.291	.311
2"	10.	.125	.15	.175	.20	.225	.25	.275	.30	.325	.35	.375
2 1/2"	10.6	.132	.159	.186	.212	.239	.265	.292	.318	.345	.371	.398
3"	12.3	.154	.185	.215	.246	.277	.308	.338	.369	.40	.431	.461
		CONCRETE WAREHOUSES										
1/2"	5.5	.066	.08	.095	.106	.119	.133	.146	.159	.172	.186	.199
3/4"	6.3	.079	.095	.11	.126	.142	.158	.175	.189	.205	.221	.236
1"	7.6	.095	.114	.133	.152	.171	.19	.208	.229	.248	.267	.285
1 1/4"	8.3	.104	.125	.145	.166	.187	.205	.228	.249	.27	.291	.311
1 1/2"	9.2	.115	.138	.161	.184	.207	.25	.253	.276	.299	.322	.345
2"	11.1	.139	.167	.194	.222	.25	.278	.305	.333	.361	.389	.416
2 1/2"	11.9	.149	.179	.208	.238	.268	.298	.327	.357	.387	.417	.446
3"	15.9	.174	.209	.243	.278	.313	.348	.382	.417	.452	.487	.521

E-102-B

LABOR: Includes handling material at site, drilling access holes, notching, cutting and installing flex, strapping, attaching at terminus.

I-58

Electrical Estimating—III

CONDUIT FLEXIBLE METALIC - WOOD COMMERCIAL BUILDINGS

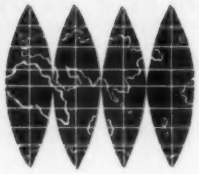
CONDUIT SIZE	HRS. "C"	LABOR COST INSTALLED PER FT. AT FOLLOWING RATES										
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
1/2"	5.6	.07	.084	.098	.112	.126	.14	.154	.168	.182	.196	.21
3/4"	6.7	.084	.101	.117	.134	.151	.168	.184	.201	.218	.235	.251
1"	8.1	.101	.122	.142	.162	.182	.203	.223	.243	.263	.284	.304
1 1/4"	8.9	.111	.134	.156	.178	.20	.223	.245	.267	.289	.312	.334
1 1/2"	9.9	.122	.147	.172	.196	.221	.245	.27	.294	.319	.343	.368
2"	11.9	.149	.179	.208	.238	.268	.298	.327	.357	.387	.417	.446
2 1/2"	12.6	.158	.189	.221	.252	.284	.315	.347	.378	.41	.441	.475
3"	14.6	.185	.219	.256	.292	.329	.365	.402	.438	.475	.511	.548
		CONCRETE - COMMERCIAL STORES										
1/2"	6.	.075	.09	.105	.12	.135	.15	.165	.18	.195	.21	.225
3/4"	7.1	.089	.11	.124	.142	.16	.178	.195	.213	.231	.249	.266
1"	8.7	.109	.131	.152	.174	.196	.218	.239	.261	.283	.305	.326
1 1/4"	9.4	.118	.141	.165	.188	.212	.235	.259	.282	.306	.329	.353
1 1/2"	10.5	.131	.158	.184	.21	.236	.263	.289	.315	.341	.368	.394
2"	12.7	.159	.191	.222	.254	.286	.318	.349	.381	.413	.445	.476
2 1/2"	13.5	.169	.203	.236	.27	.304	.338	.371	.405	.439	.473	.506
3"	15.9	.199	.239	.278	.318	.358	.398	.437	.477	.517	.557	.596

E-102-B

LABOR: Includes handling material at site, drilling access holes and notching; cutting and installing flex, strapping, attaching at terminus.

I-58

Electrical Estimating—III



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Duct Heaters
Room Thermostats

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Chromalox Surface, Oven, and Broiler Units

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Finstrip
Microfin
Ring
Tubular
Heating Cable

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Melting Pots

Controls

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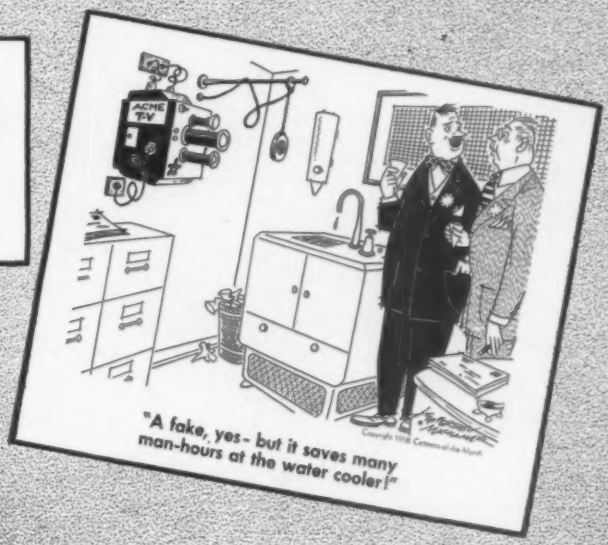
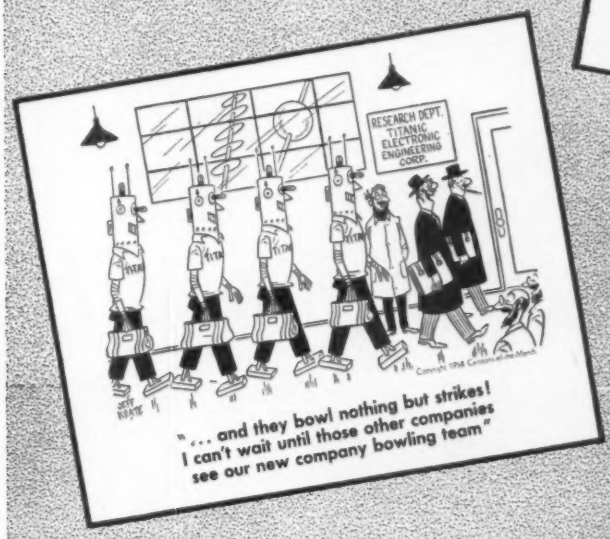
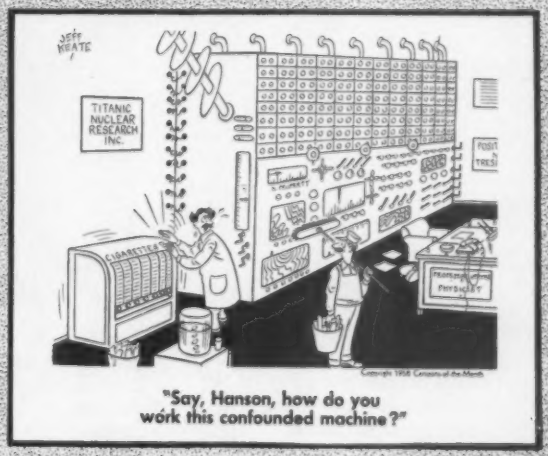


"A fake, yes - but it saves many man-hours at the water cooler!"



"... and they bowl nothing but strikes! I can't wait until those other companies see our new company bowling team"

"I guess you know who's the boss in that family!"



"Say, Hanson, how do you work this confounded machine?"

News of the industry

edited for Southern readers

Institute elects McAfee president

J. W. McAfee, president of the Union Electric Co., St. Louis, Mo., has been elected president of the Edison Electric Institute, and J. E. Corette, president of The Montana Power Co., Butte, Mont., has been elected vice-president of the electric industry's trade association. Both were elected by the Institute's board of directors at its recent quarterly meeting.

Mr. McAfee, formerly EEI vice-president, succeeds Donald S. Kennedy, chairman of the board and president of the Oklahoma Gas and Electric Co., Oklahoma City, as Institute president. Mr. McAfee and Mr. Corette will serve in their new capacities until June 1958.

Mr. Kennedy resigned the Institute presidency, citing the heavy demands of both the trade association position and his duties as a company chief executive, which have become more strenuous due to recent retirement of key executives in his company organization. He said these factors made his action necessary, to avoid neglecting seriously one or the other responsibility.

The Institute Board, in accepting Mr. Kennedy's resignation, noted that he had served the industry "with outstanding effectiveness" since his election in June, 1956, and praised "the exemplary degree of self-sacrifice and devotion to the welfare of the entire industry" he displayed during his term of office.

SEWA to hold eighth Industry Day meeting

PROGRAM plans are progressing for the eighth annual "Industry Day" meeting sponsored by the Southeastern Electrical Wholesalers Association, reports M. L. Tice, executive vice-president. The meeting will be held at the Atlanta Biltmore Hotel, January 29-31, 1958.

Among those who will address wholesalers and their guests from the electrical contracting, utility, and manufacturer branches of the electrical industry will be Frank R. Widmer, Commercial Research Division of Republic Steel, Cleveland, O.; Larry P. Pleasants, Sylvania Electric Co., Salem, Mass.; Howard Farley, manager of Distributor and Contractor Sales, Anaconda Wire and Cable Co., New York City; G. Dewey Hynes, vice-president, General Cable Corp., New York City; Carl S. Menger, vice-president, Triangle Conduit and Cable Co., New Brunswick, N. J.; Leon T. Kendall, Federal Reserve Bank, Atlanta.

A special feature of the program will be the Southern Breakfast Party given by the Southeastern Electrical Manufacturers Representatives Club.

Cecil J. Matthews, of Matthews Electric Supply Co., Birmingham, and president of SEWA, will preside over the sessions of the "Industry Day" meeting. Other officers of the association are Russell S. Hughes, Hughes Supply, Inc., Orlando, vice-president; and Fred H. Dendy, Electrical Wholesalers, Inc., Atlanta, treasurer.

Miami apprentice awards presented

ELECTRICIAN Apprentice Americo A. DeMeo recently received a plaque as runner-up in the competition for the Frank J. Rooney Award for Outstanding Apprentice in South Florida.

Candidates among eight building crafts competed for the main award, won by Plumber Apprentice Jack L. Meggison, of Hialeah.

Mr. DeMeo recently received recognition at a dinner in Miami of two hundred representatives of labor and management who heard an address by William P. Patterson, special assistant to Secretary of Labor James L. Mitchell and former director of the department's apprenticeship training program.

Mr. Patterson lauded the awards and the competition as "one of the most productive devices yet discovered for improving the skills

Americo A. DeMeo, left, apprentice electrician, represented one of eight crafts in the building industry in Greater Miami competing for the Outstanding Apprentice Award. Frank J. Rooney, right, Miami general contractor and sponsor of the first Apprenticeship Awards Dinner, presented Mr. DeMeo with a plaque as the winner in the electrical apprenticeship program. The Rooney Apprentice Award will be made annually.

of the nation," and said other cities would be encouraged to institute similar award programs.

He noted the two foremost problems in meeting the country's skilled manpower requirements as the demand for more training of skilled personnel to match industry's needs, and the necessity for attracting more qualified applicants for apprenticeship programs.

Miami's Apprenticeship Awards, he said, is one way the construction industry can meet these problems.

DeMeo is completing his apprentice training program at Lindsey Hopkins Vocational School in Miami. Other crafts represented in the competition included air conditioning and refrigeration, carpentry, ironworkers, plastering, roofing, sheet metal, and plumbing.

Frank J. Rooney, president of the Frank J. Rooney, Inc. construction firm in Miami, is sponsor of the awards. He told the audience that the presentations will be made annually to encourage enrollments in the apprenticeship program and to recognize the achievements of those enrolled.

A firm advocate of trade and industrial education, Rooney said he believes apprenticeship programs will play a large part in determining the future success of the construction industry, in this country.

Distributors report business outlook

"Less Volume and More Profit" seems to be the goal electrical distributors will be shooting for as they enter into what most businessmen feel is a "breathing spell" in the most prolonged and phenomenal business boom in history, reports the National Association of Electrical Distributors in its year-end report.

Whether or not the wholesale distributor can break out of the cost-profit squeeze he has been experiencing may be indicated in the year 1958. While sales and profits of electrical wholesale distributors were down slightly from the previous year—for the overall industry—a large number of full functioning distributors report sales for 1957 up a few percentage points and profits improved slightly. The indications are that the full functioning wholesale firm will again emerge in a stronger position than ever this year.

But it will be an uphill climb against a background of intense competition, retrenchment, greater selectivity on the part of both the electrical distributor and manufacturer, and a rash of bankruptcies

and mergers in the distribution field.

The handwriting has been on the wall for some months now. A leveling off in business—in both the construction and consumer goods field—was the experience of many distributors in 1957. Margin rates continued to be inadequate in view of the problems of rising payrolls, freight rates and interest charges for commercial money.

Distributors have had to meet these and other increased costs by greater efficiency and more careful sales effort. The fact that many firms have been able to continue progressing and expanding in the face of the cost and profit squeeze is a tribute to the management of the full functioning distributors. Inventory reductions, the introduction of new methods and procedures and a general tightening of all expenditures has been the program to combat declining profits.

A number of economists forecast a good business year in 1958. They also see the next twelve months as one of the most competitive years since the end of World War II. This will not be a new experience for distributors in the electrical industry.

However, the competition in 1958, contrasted to that of recent years, should be a little healthier and on a more sensible basis. The marginal operators who have lived off the heavy volume of the electrical industry have felt the pinch of a less-than-boom year.

Manufacturers are culling their distributor lists and placing more and more emphasis on the soundly financed, full functioning distributor. These distributors, likewise, are already in the process of reviewing their own manufacturer lists with a view to dropping the unprofitable lines in their business.

It can be anticipated, also, that the distributors will concentrate more on fewer lines and carry through their full stocking function on these lines.

A general tightening of credit in order to reduce accounts receivables, along with a return to selling on the basis of quality and service are indicated in the forward planning of the full functioning distributors. Those distributors who concentrated on these two actions in 1957 have fared better than the industry in general.

Voltage regulator shown at customer's front door

"TAKE your product to the customer and show him how it works" is good advice for any salesman.

But how do you show customers a highly engineered product that weighs over a thousand pounds and operates only when mounted on a power pole or a substation and hooked into an electric distribution system?

The answer, for the voltage regulator production section of General Electric's Power Transformer Department was the Voltage Van, a custom built, travelling demonstrator.

Inside of the Voltage Van, operated by the Voltage Regulator Product Section of General Electric Co. Equipment includes a fully operating ML32 regulator and equipment to demonstrate line drop compensation.

The purpose of the new Voltage Van is to explain to users of voltage regulating equipment just how regulators can assist on various types of systems, and under many system conditions. The program presented in the Van will also explain the theories of regulator operation and application.

The Voltage Van is now carrying the product, actual operating Type ML32 step voltage regulators, to electric utilities and rural electrical systems.

A fully operating ML32 regulator is mounted inside the Voltage Van and connected to a model distribution system, and meters at various points show the effect of the regulator under various conditions. The tap changer operates exactly as it would when installed on a distribution line. The electrical functions are realistic, having been scaled down for a 120-volt circuit. Even the effect of line drop compensation on long feeders is shown electrically.

Also on display is an operating cutaway model of the regulator, with its inner parts revealed.

The Voltage Van has seats for fifteen persons, a lectern, and complete equipment for projecting slides and film strips. The Van has a built-in sound system and is completely air-conditioned and heated. The vehicle has attractive paneled walls, wall displays depicting various distribution system problems, and an acoustical metal ceiling. The upholstered chairs are of the most modern and comfortable type.

The Voltage Van is built on a GMC truck chassis. The body was constructed by the Gerstenslager Company of Wooster, Ohio, and the display by Mastercraft Associates, Inc., New York.

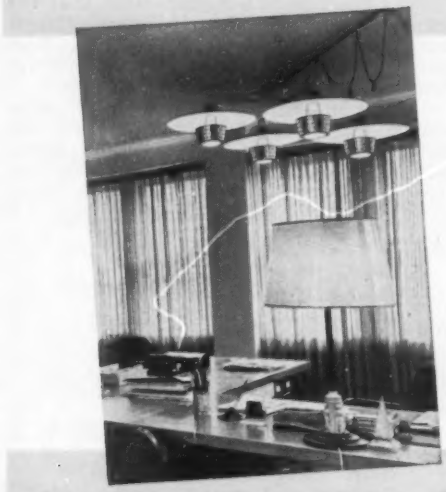
After several months of touring General Electric's Southwestern District, the Voltage Van will go to other districts of the company's Apparatus Sales Division.

The truck's exterior is painted in the General Electric colors, blue with gray and orange trim. The driver's cab is also air-conditioned.

Southwestern sets winter heating rates

THE SWITCH to All-Electric Living gained impetus when Southwestern Gas and Electric Company announced reduced rates for electric heating.

All customers heating their home with electricity will pay only one-and-a-half cents per kilowatt hour for all electricity used over 500 kwh each month. To be eligible for this rate, a customer



Now You can sell the Beauty of

Custom Lighting

at standard fixture prices

Every store, *every* showroom, *every* restaurant, yes, even offices are top prospects for the Virden Wondabar! This wonderfully versatile kit lets you add the beauty and sales appeal of custom-made fixtures at only a fraction of their cost. And you sell the complete job, not just the installation.

For the Wondabar uses standard Virden fixtures. Lets you select from Virden's wide range of modern, contemporary, period and traditional designs to gain any decorative effect desired. Can be used with dimmer controls for even more dramatic effects. Installation is most economical, too, usually without rewiring or expensive remodeling.

Wondabar kits are available in 3, 4 or 5 arm spreads in almost any length ceiling drop. See your Virden distributor. Look in the yellow pages of your phone book or write John C. Virden Co., 6103 Longfellow Avenue, Dept. ES, Cleveland 3, Ohio.

Wondabar

by **virden**

Member American Home Lighting Institute

VIRDEN Lighting

must have either a heat pump or 5,000 watts of permanently installed heating in his home.

This new rate applies during the six months billing cycles from November through April. The new rate makes electric heating economically feasible for practically all of their customers.

Along with the other electric utilities operating in the southwest, Southwestern anticipates that within the space of a few years, the electric home heating load will grow to a sizeable segment of the residential load.

The national trend shows electric heating is becoming more and more popular and only a short time will be needed to see it grow to full public acceptance.

This definite trend is borne out by the fact that at least twelve to fifteen major manufacturers are now engaged in producing a reverse cycle heat pump.

Proof of the economy of electric home heating was pointed up in the recent announcement that the 1,535-home housing development at the Little Rock Air Force Base will employ the heat pump for year round conditioning.

In addition to heat pumps, other forms of electric heating are catching on in this area. Three homes in the Arkansas Division are preparing to install Glassheat Panels for full house heating.

Dates Ahead

Edison Electric Institute, Industrial Relations Committee, Mayflower Hotel, Washington, D. C., Jan. 16-17, 1958.

Southeastern Electric Exchange, Personnel Administration Section, Biltmore Hotel, Atlanta, Ga., Jan. 16-17, 1957.

Southeastern Electrical Wholesalers Assn., 8th Annual Industry Day Meeting, Biltmore Hotel, Atlanta, Ga., Jan. 29-31, 1958. M. L. Tice, Exec. Vice-Pres., P. O. Box 176, Ben Hill Station, Atlanta 11, Ga.

American Institute of Electrical Engineers, Winter General Meeting, Hotel Statler, New York, N. Y., Feb. 2-7, 1958.

Edison Electric Institute, Electrical Equipment Committee, Dayton Biltmore Hotel, Dayton, Ohio, Feb. 10-11, 1958.

Edison Electric Institute, Transmission and Distribution Committee, Lord Baltimore Hotel, Baltimore, Md., Feb. 11-12, 1958.

Edison Electric Institute, Meter and Service Committee, Sheraton Hotel, Philadelphia, Pa., Feb. 17-19, 1958.

National Adequate Wiring Conference, Statler Hotel, Detroit, Mich., Feb. 20-21, 1958.

Southern Safety Conference and Exposition, Peabody Hotel, Memphis, Tenn., March 2-4, 1958.

American Institute of Electrical Engineers, Textile Conference, Georgia Institute of Technology, Atlanta, Ga., March 13-14, 1958.

Edison Electric Institute, 24th Annual Sales Conference, Edgewater Beach Hotel, Chicago, Ill., March 24-27, 1958.

Oklahoma Utilities Association, Annual Convention, Biltmore Hotel, Oklahoma City, March 27-28, 1958.

American Institute of Electrical Engineers, Pulp and Paper Conference, North Carolina State College, Raleigh, N. C., March 27-29, 1958.

Southeastern Electric Exchange, Annual Conference, Boca Raton Hotel and Club, Boca Raton, Fla., March 31-April 2, 1958.

American Institute of Electrical Engineers, Southwest District Meeting, Mayo Hotel, Tulsa, Okla., March 31-April 2, 1958.

Illuminating Engineering Society, East Central Regional Conference, Richmond, Va., April 14-15, 1958.

Protective Relay Conference, Eleventh Annual Conference, Texas A&M College, College Station, Tex., April 14-16, 1958. Write L. M. Haupt, Conference Chairman.

Southeastern Electric Exchange, Heat Pump Steering Committee, Leisure House, Tampa Electric Co., Tampa, Fla., April 16-18, 1958.

Southeastern Electric Exchange, Engineering and Operation Section, Buena Vista Hotel, Biloxi, Miss., April 21-22, 1958.

Illuminating Engineering Society, South Central and Southeastern Joint Regional Conference, Hotel Lafayette, Little Rock, Ark., April 24-25, 1958.

American Institute of Electrical Engineers, Middle Eastern District Meeting, Washington, D. C., April 28-30, 1958.

Illuminating Engineering Society, Southwestern Regional Conference, Shreveport, La., April 28-29, 1958.

American Institute of Electrical Engineers, Middle Eastern District Meeting, Washington, D. C., April 28-30, 1958.

Illuminating Engineering Society, Midwestern Regional Conference, Kansas City, Mo., May 1-2, 1958.

Edison Electric Institute, Electrical Equipment Committee, Radisson Hotel, Minneapolis, Minn., May 12-13, 1958.

American Institute of Electrical Engineers, East Central District Meeting, Huntington, W. Va., May 13-15, 1958.

Southeastern Electric Exchange, Industrial Power Sales Conference, Edgewater Gulf Hotel, Gulfport, Miss., May 29-30, 1958.

National Telemetering Conference, (AIEE-ISA-IAS), Lord Baltimore Hotel, Baltimore, Md., June 2-4, 1958.

National Association of Electrical Distributors, 50th Annual Convention, Civic Auditorium, San Francisco, June 9-13, 1958.

American Institute of Electrical Engineers, Summer General Meeting, Buffalo, N. Y., June 22-27, 1958.

American Institute of Electrical Engineers, Petroleum Industry Conference, Baker Hotel, Dallas, Sept. 15-17, 1958.

Edison Electric Institute, Meter and Service Committee, Plaza and Driscoll Hotels, Corpus Christi, Texas, Sept. 22-24, 1958.

Southeastern Electric Exchange, Engineering and Operation Section, Hotel Roanoke, Roanoke, Va., Oct. 20-21, 1958.

National Electrical Contractors Association, Annual Convention, Dallas, Texas, Nov. 19-22, 1958.

ELECTRICAL SOUTH
806 Peachtree St., N.E.
Atlanta 8, Ga.

January, 1958

Gentlemen:

Please send me additional information on items mentioned in this issue of Electrical South. I have listed the key numbers of these items at right.

(Print Plainly)

Name ..... Title .....

Company .....

Address .....

City & State .....

☐ Enter my subscription to ELECTRICAL SOUTH and bill me at the special rate of three years for $3.00

FOR MORE INFORMATION—Use this handy return coupon for requesting additional information on products listed or bulletins announced. Be sure to give your firm name and your position or title. You may request additional information on new utility products, pages 71-74; new electrical products, pages 94-97; or new catalogs and bulletins, pages 100-101. Write in item numbers in coupon space above.

News about people

James F. Whitehead, Jr., executive vice-president of Day-Brite Lighting Incorporated has been elected to the board of governors of the **National Electrical Manufacturers Association.**

James F. Whitehead

Long active in the lighting industry, Mr. Whitehead is also Chairman of the Commercial and Industrial Lighting section of NEMA. He is a trustee for R L M Standards Institute.

John K. Hodnette of Pittsburgh, vice-president and general manager and a member of the board of directors, Westinghouse Electric Corp., has been awarded the 1957 Edison Medal by the **American Institute of Electrical Engineers.**

The Medal, one of engineering's coveted awards, was won by Mr. Hodnette "for his significant contributions to the electrical industry through creative design and development of transformer apparatus which marked new advances in protection, performance and service. For his vision, judgment and management skill which fostered and achieved the practical application of his ideas with resulting advancements in the elec-

John K. Hodnette

trical industry."

The Medal will be presented to Mr. Hodnette at the opening general session, Monday, Feb. 3, of the five-day Winter General Meeting of AIEE at the Hotel Statler, New York.

A. P. Wood was installed as president at a recent meeting of the **Louisiana Electric Cooperative, Inc.**

J. P. Grey was installed as vice-president, and **Orval Crouch** as secretary - treasurer. Thirteen farmer-owned electric cooperatives were represented at the meeting.

Announcement has been made of the apointment of **H. R. Weibel** to the position of field sales manager for the **Pyle-National Company.** He joined the firm in 1955 as district manager at St. Louis.

Before joining Pyle-National Mr. Weibel was associated with the Chicago Lighting Institute and the General Electric Co. He is a graduate of Iowa State College.

Edward V. Diercks has been named general sales manager of **Anderson Electric Corporation,** with manage-

Edward V. Diercks

ment duties in the advertising and public relations departments of the firm.

Mr. Diercks is a graduate of Cornell University and was previously associated with the Joslyn Manufacturing and Supply Co.

Carl S. Menger, vice-president in charge of sales for **Triangle Conduit and Cable Co., Inc.,** has been elected chairman of the Rigid Steel Conduit and Electrical Metallic Tubing Section of the **National Electrical Manufacturers Association.**

As chairman of the section, Mr. Menger is an ex-officio member of the Advisory, General Engineering, Legislative and Tariff, Membership, Promotional, Statistical, Industrial Labor Relations, and Traffic Committees.

Southern States Equipment Corporation recently announced important organizational changes affecting **J. E. Cordell** and **T. A. Burdeshaw.**

Mr. Cordell was elected vice-president in charge of sales. He came with Southern States in 1953 as assistant sales manager and was later named sales manager. Prior to his

J. E. Cordell

association with Southern States, he held positions with Ebasco Services, Inc., Shell Oil Co., and Pan American Airways, Inc. Mr. Cordell is an engineering graduate of St. Johns University.

Mr. Burdeshaw was elected vice-president, engineering. He came with Southern States from Birmingham Electric Company in 1941, later being

T. A. Burdeshaw

appointed engineering manager, with full responsibility for all engineering activities. Mr. Burdeshaw studied electrical engineering at Alabama Polytechnic Institute.

Joel H. Watkins, formerly vice-president in charge of transformer sales, has been made vice-president and manager of the Transformer Division of **Kuhlman Electric Co.**

Mr. Watkins has been with Kuhlman for four years, having joined the company in 1953 as sales manager. He is a graduate engineer from the University of Virginia and is a member of the American Institute of Electrical Engineers.

The appointment of **Virgil S. Price** to the advertising department of **Tampa Electric Co.**, has been announced by **M. T. Anthony**, general sales manager of the firm.

Mr. Price is a graduate of the University of Georgia School of Jour-

Virgil Price

nalism. During the past four years he was associated with Southern Appliances Magazine in Atlanta. He served two years as associate editor and was editor of the publication in 1956 and 1957.

Leon B. Murray, formerly superintendent of transmission, has been promoted to assistant manager of transmission and distribution at **Alabama Power Co.**, succeeding the late **L. C. Flournoy.**

Mr. Murray is a native of Moss Point, Mississippi. He has a B. S. and an E. E. degree from Louisiana State University. Coming to the Company in 1939, he worked as a junior engineer in the Engineering and Construction Department and became an assistant engineer in 1941. From 1942 to 1945, he was in military service, returning to the company in 1945 as an engineer in the general office. He became a senior engineer in the Engineering and Construction Department in 1950, became superintendent of miscellaneous operations in 1953 and superintendent of transmission in 1954.

Alan R. Barton, Jr., succeeds Mr. Murray as superintendent of transmission. He has B. E. and M. E. degrees from Tulane University and a degree in electrical engineering from Alabama Polytechnic Institute. He came to the company in 1947 as a junior engineer at Mobile and, since that time, has been a senior division engineer, a senior engineer in miscellaneous operations in the general office, and superintendent of miscellaneous operations.

R. T. Garlington, formerly assistant superintendent of distribution, has been made superintendent of miscellaneous operations. A native of Camp Hill, Alabama, Mr. Garlington received his degree in electrical engineering from Alabama Polytechnic

Institute. He was employed by the company in 1935 as a single phase meter tester at Huntsville. He successively became junior engineer, distribution engineer and district engineer. He was senior district engineer at Selma, transferring to Birmingham in 1947 as senior engineer in the distribution department. Mr. Garlington has been assistant superintendent of distribution since 1954.

C. C. Strozier, who came with the company in 1945 as a senior engineer in the distribution department, has been advanced to assistant superintendent of distribution. A native of Cordele, Georgia, Mr. Strozier is an electrical engineering (B. S. 1937) graduate of Alabama Polytechnic Institute. He spent some time with Colorado Public Service Company in a junior engineer training program and then was transferred to the East Tennessee Light and Power Company. At the time he joined Alabama Power Company he was district superintendent of the Tennessee company.

Fredrick Keller, vice-president of **Thomas Industries, Inc.,** has announced the promotion of **E. Allen**

E. Allen Lea

Lea to the position of sales manager for the Lighting Division. His new duties will include Moe Light, Star Light and Radiant Glass.

Mr. Lea joined the company in 1947 as a sales representative, later becoming a district sales manager and a divisional sales manager. He was most recently assistant sales manager for the Lighting Division.

Appointment of **P. Howard Farley** to the position of manager, distributor and contractor sales, has been announced by **Anaconda Wire & Cable Co.**

Mr. Farley joined the Anaconda Company subsidiary late last year as manager of contractor sales, after having been sales promotion manager and also director of marketing for the National Electrical Contractors Association during the period of 1953-1956.


The Fifty Largest Utilities as listed in the 1957 FORTUNE DIRECTORY
★ American Tel. & Tel. (New York)
★ Pacific Gas & Electric (San Francisco)
★ Consolidated Edison of New York
★ Commonwealth Edison (Chicago)
★ American Gas & Electric (New York)
★ Tennessee Gas Transmission (Houston)
★ Public Service Elec. & Gas (Newark, N. J.)
★ Southern California Edison (Los Angeles)
★ Southern Co. (New York)
★ Detroit Edison (Detroit)
★ Philadelphia Electric (Philadelphia)
★ Niagara Mohawk Power (Syracuse, N. Y.)
★ General Telephone (New York)
★ El Paso Natural Gas (El Paso, Texas)
★ Columbia Gas System (New York)
★ General Public Utilities (New York)
★ Consumers Power (Jackson, Mich.)
★ American & Foreign Power (New York)
★ American Natural Gas (New York)
★ United Gas (Shreveport, La.)
★ Texas Utilities (Dallas)
★ Middle South Utilities (New York)
★ Pacific Lighting (San Francisco)
★ Texas Eastern Transm. (Shreveport, La.)
★ Consolidated Natural Gas (New York)
★ Central & South West (Wilmington, Del.)
★ New England Electric System (Boston)
★ Pennsylvania Power & Light (Allentown)
★ Union Electric (St. Louis)
★ Ohio Edison (Akron)
★ Virginia Electric & Power (Richmond)
★ Peoples Gas Light & Coke (Chicago)
★ Northern States Power (Minneapolis)
★ Cleveland Electric Illum. (Cleveland)
★ West Penn Electric (New York)
★ Duke Power (Charlotte, N. C.)
★ Long Island Lighting (Mineola, N. Y.)
★ Baltimore Gas & Electric (Baltimore)
★ Duquesne Light (Pittsburgh)
★ Northern Natural Gas (Omaha, Neb.)
★ Wisconsin Electric Power (Milwaukee)
★ Transcontinental Gas Pipe Line (Houston)
★ Panhandle Eastern Pipe Line (New York)
★ Public Service of Indiana (Plainfield)
★ Florida Power & Light (Miami)
★ Illinois Power (Decatur, Ill.)
★ Western Union Telegraph (New York)
★ [illegible] (Boston)
★ New York State Electric & Gas [illegible]
★ Cincinnati Gas & Electric (Cincinnati)
© 1957 Time Inc.
Among the 50 largest utilities, only one electric or telephone utility is a Preformed prospect...
the rest are Preformed customers
In July, 1947, Preformed Line Products Company didn't have a customer; all the electric and telephone utilities were prospects. Today, the situation is almost completely reversed.
For example, in FORTUNE's list of the "Fifty Largest" utilities, only one of the *electric* and *telephone* utilities mentioned is still a prospect; all the rest are now Preformed customers. In other words, the Preformed principle of using preformed helical rods for line accessories has gained almost complete acceptance in only 10 years.
If you are among the few utilities not utilizing Preformed, you might ask "Why?". PREFORMED LINE PRODUCTS COMPANY, 5349 St. Clair Avenue, Cleveland 3, Ohio. Cable Address: Preformed-Cleveland
...in 10 years the leading manufacturer or armor rods, dead-ends, Guy-Grip dead-ends, splices and other line accessories.
PLP
You can look up to Preformed

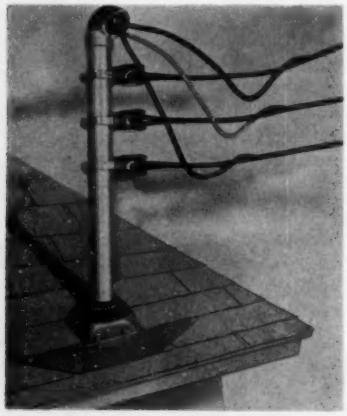
New products

Service entrance mast kit offers threadless fitting

PERMANENT installations on ranch style homes and other one-story buildings are simplified with the service entrance mast kit offered by the Crouse-Hinds Co., Wolf and Seventh North Sts., Syracuse 1, N. Y.

Included in the kit are service entrance head, roof plate and flashing with Neoprene storm collar, mast support with lag screw, offset reducer and wireholder.

The combination one-piece roof plate and flashing of galvanized steel supports the mast at the highest possible point on the house. The



Neoprene storm collar provides an effective, permanent weather-tight seal and eliminates the need for calking with compound. Because of slip fit design, threadless fitting means quick and efficient installation. The mast is completely safe and will withstand 2600 pounds pull.

For additional data, ask for item P-114, using the coupon on page 87.

Four-pole busway with low voltage drop characteristics

A FOUR-POLE, plug-in busway with low voltage drop characteristics has been announced by the Distribution Assemblies Dept., General Electric Co., Plainville, Conn. The new four-pole busway, designiated as Type LVDP, is rated from 600 to 4000 amperes, 600 volts or less.

Principal applications for the new four-pole busway are as a vertical riser in multi-story commercial and industrial buildings where frequent power tap-offs are required.

Type LVDP comes in standard ten-foot straight lengths with either aluminum or copper bus bars. Each standard length has ten plug outlets, five on each side. Low-voltage-drop characteristics of Type LVDP are obtained by interlocking closely spaced bus bars in recurring sequence with no adjacent bus bars having the same polarity.

Installation costs for both three- and four-pole Type LVDP busway are lower than for most conventional low-voltage-drop feeder systems utilizing cable tap boxes for tap-offs.

For additional data, ask for item P-115, using the coupon on page 87.

Relay test unit allows immediate determination

THE RELAY TEST unit now offered by the Touch-Plate Manufacturing Corp., P. O. Box 1970, Long Beach, Calif., makes possible the immediate determination of relay condition in remote control type wiring installations.

This handy unit will allow countermen to immediately test relays which are being returned as inoperative. There is no need to keep the customer waiting for a factory report.

The three-pound unit is a compact 5x4x3 inches and is finished in an attractive hammertone grey.

Operation is simple: connect relay coil to the two top clips, connect 110v coil leads to bottom clips, press button several times in rapid succession. If light operates each time, this indicates relay operation is satisfactory.

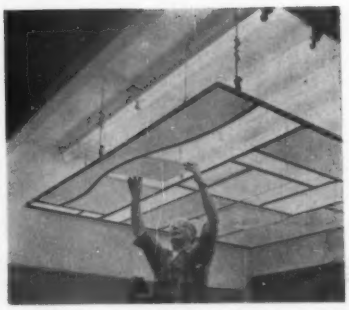
For additional data, ask for item P-116, using the coupon on page 87.

Colored diffusing panels in versatile lighting system

INTRODUCTION of a new concept in overall lighting has been announced by Electro Silv-A-King Corp., 1535 South Paulina St., Chicago 8, Ill. The LumenArea ceiling system allows unlimited effects with standard parts, easy and economical installation, and introduces the colored Polycube overlap-reverse-interlok plastic louver.

The Electro LumenArea ceiling system allows the architect, consulting engineer, and designer to use the ceiling as a source of light — and at the same time create whatever atmosphere he desires.

Contractors will enjoy the labor saving LumenArea system using a system of slide adjustment and adjusto-lok hanging devices. The same T-Track is used everywhere, including the perimeter. The slide fittings are used on the straight as well as curved T-tracks. The hanger assembly slides anywhere — to bypass,



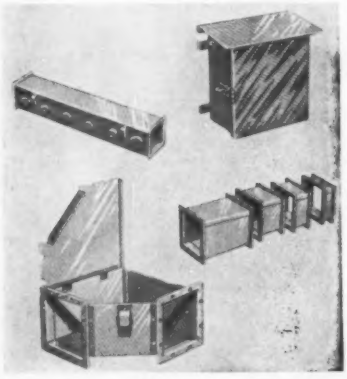
beams, ducts, or pipes.

The adjusto-loks allow quick leveling adjustment as well as any plenum depth desired. The unit adjusts to hang on beams and ceilings in the same installation and uses lay-in type diffusing media for easy and quick installation.

For additional data, ask for item P-117, using the coupon on page 87.

Electric junction box line in galvanized and grey enamel

A COMPLETE LINE of electric junction boxes is offered by General Metals Inc., P. O. Box 448, Greensboro, North Carolina. The line includes hinge cover boxes, screw cover boxes, gasketed screw cover boxes, telephone cabinets, screw cover wiring troughs, screw cover service duct,



hinge cover wireways and fittings, loom pedestals and floor boxes, weatherproof hinge door cabinets and indoor transformer cabinets. The boxes are offered in both galvanized and grey enamel.

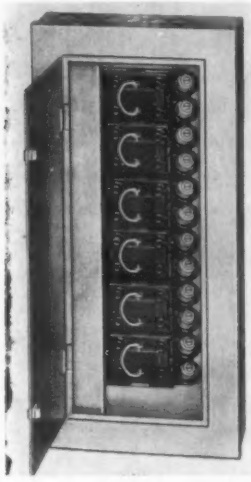
For additional data, ask for item P-118, using the coupon on page 87.

Three-pole, solid neutral 125 ampere service device

THE NEW 125 ampere service equipment offered by Wadsworth Electric Manufacturing Co., Inc., 20-34 West 11th St., Covington, Ky., is a three pole, solid neutral, 120-240 volt a-c device.

This new switch has (6) "Renu-Fuse" pull cover circuits, and 12 plug

fuse circuits. One 60 amp "Renu-Fuse" unit controls the 12 plug fuse circuits and sub-feed terminals, the other 60 amp controls the range. The remaining (4) "Renu-Fuse" units are



30 ampere (and horsepower rated) and can be used for water heater, dryer, air conditioners and other uses.

The line side lugs, including neutral, are so designed to take aluminum or copper wire. The cabinet is available in both flush and surface type door trim.

For additional data, ask for item P-119, using the coupon on page 87.

Expandable mounting brackets for built-in wall heaters

A NEW BRACKET for speedy, economical mounting of Markel and LaSalle built-in wall Heetaires has just been made available from the manufacturers at 145 Senaca St., Buffalo 3, N. Y.

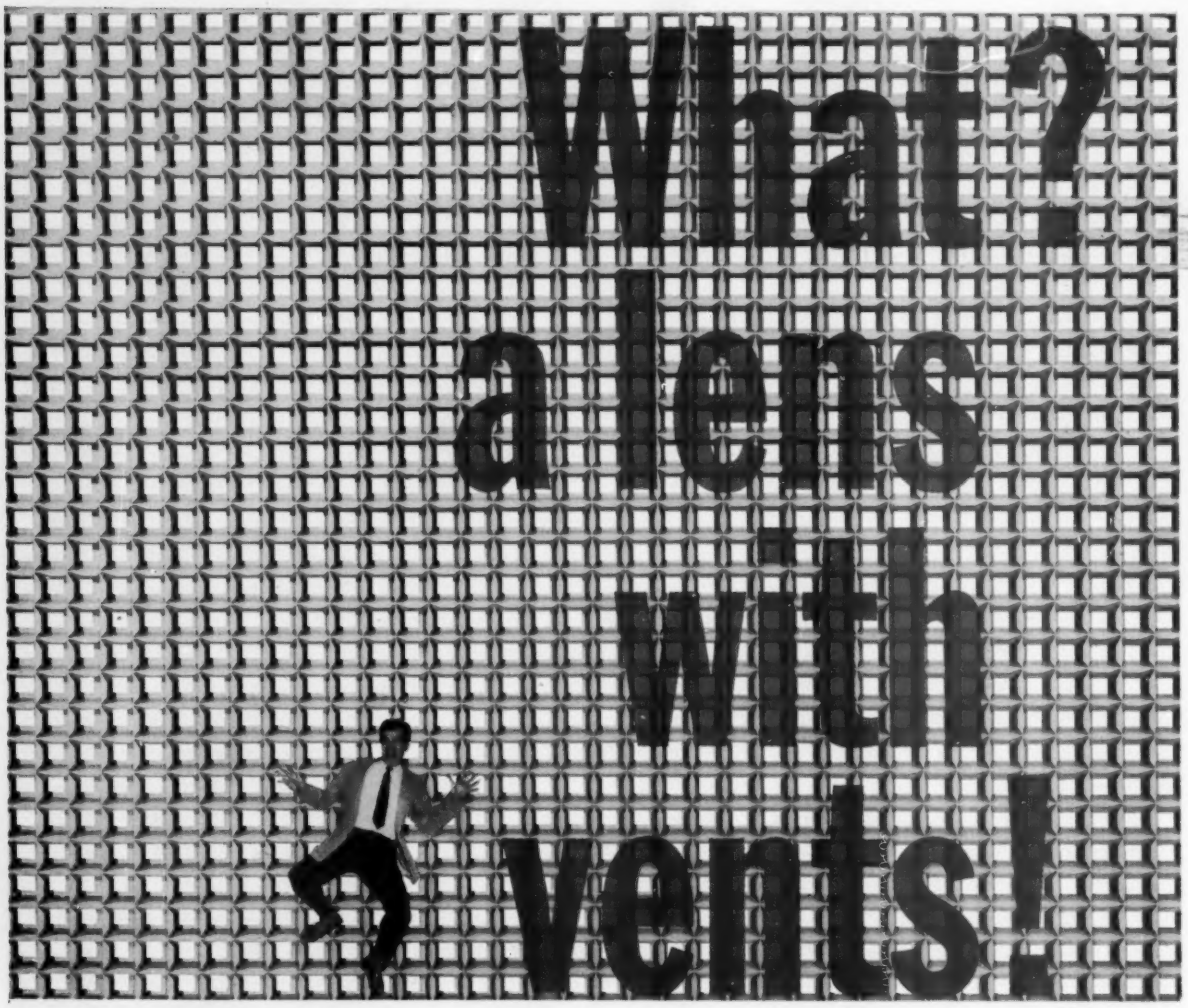
This new development, which includes a box with expandable mounting brackets, makes it possible to mount Markel and LaSalle built-in wall Heetaires in either new or old construction in a matter of minutes, and with a labor-saving cost of 50 per cent and more.

All Markel and LaSalle built-in Heetaires are now being supplied with the new S 1713 YG box, complete expandable mounting brackets. These mounting brackets (or adjustable straps) on the box are expandable to reach studs 16" or less on centers. The straps are easily removable to fit small openings.

For additional data, ask for item P-120, using the coupon on page 87.

Floor-level fitting for low and high tension service

WALKER BROTHERS, of Conshohocken, Pa., announce a new floor-level fitting which is designed to serve equipment having minimum floor



ballast men are amazed about Guth Prismoid-GrateLite*

When a recent visitor to our plant saw a section of the new Guth Prismoid-GrateLite lying flat on white paper, his eyes sparkled.

He held it up and exclaimed, "It's great! It's got holes!"

Our visitor was a ballast salesman, and he was mighty happy that the gorgeous new Prismoid has holes. As he explained, almost everyone is enclosing ballasts, cooping up the heat, cutting down fixture depth... making it tougher than ever for ballasts to serve their legitimate lives.

But here is Prismoid, a prismatic louver-lens *with holes!* The ballast salesman said, "It's certainly a step in the right direction!"

Thanks to Prismoid's *breathing action* ballasts get ventilation, lamps are cooled and the flowing air helps keep lamps, Prismoid and fixtures up to 50% cleaner than solid panels.

Guth

PRISMOID
GRATELITE
Prismatic Louver-Lens

*T. M. Reg. U. S. & Can. Pats. Pend.

THE EDWIN F. GUTH COMPANY • ST. LOUIS 3, MISSOURI
TRUSTED NAME IN LIGHTING SINCE 1902

clearances or for receptacle outlets used in exposed areas.

The fitting for high tension service accommodates several types of receptacles including a single 3-wire receptacle with a grounded U-slot. The low tension fitting is furnished with a bushed hole in the bell cap.

Fitting consists of a housing, flange and bell cap—with a receptacle and insulator furnished on fittings for high tension service. Fittings can be threaded into 1.9" I.D. inserts or can be threaded, using an adapter, into 2" IPS and 2.5" I.D. inserts. When installed the fitting is 1" high.

For additional data, ask for item P-121, using the coupon on page 87.

Vinyl plastic tape for total adhesion

A NEW VINYL PLASTIC tape for total adhesion, producing better splicing and longer life through molecular fusion of adhesive to vinyl base, and far exceeding all previous specifications for plastic tape, has been announced by Plymouth Rubber Co., Inc., Canton, Mass.

New Slipknot #7 plastic electrical tape is the result of many years of laboratory research, and has recently successfully completed many months of testing under exterme field conditions by selected contractors, utilities and industrials. All reports from the field have been glowing in their praise of the new tape, the factory reported.

Slipknot #7 is .007" vinyl tape with a minimum dielectric strength of 10,000 volts. The formula used in its manufacture, ZF-90, produces inseparable fusion of the adhesive and backing so that they cannot come apart. Tests prove that the adhesive will neither creep nor strip off the base, and therefore the tape will not dry out. Splices are said to mold better and hold better than ever before.

For additional data, ask for item P-122, using the coupon on page 87.

Ducts and outlets for over-the-floor application

A NEW STUMBLE-PROOF over-the-floor duct has been introduced by CMG Industries, Inc., 615 South Second Ave., Laramie, Wyoming.

Called Electriduct, this new noiseless rubber duct for eliminating serious accidents caused by tripping on electrical wiring, small hoses, metal tubing, etc., lying on top of the floor was designed for: laboratories, workshops, homes, offices, etc.

It's stumble-proof and unobstructive and heavy equipment on casters rolls over easily.

For additional data, ask for item P-123, using the coupon on page 87.

Technical books

Transistor electronics

"Transistor Electronics," by David DeWitt and Arthur L. Rossoff. Published by McGraw-Hill Book Co., 327 West 41st St., New York 36, N. Y., 392 pages, 188 illustrations, $8.00.

This newly-published book is planned to provide a thorough familiarity with the properties of the transistor and its underlying physical mechanisms.

Step-by-step, it gives the practicing or beginning engineer a working knowledge of quantitative transistor circuit design, based on a clear-cut understanding of the internal workings of the transistor device. It assures useful design accuracy without a prior knowledge of quantum mechanics.

Early chapters deal with semiconductor physics. They touch lightly upon quantum mechanics, energy band theory, and Fermi statistics, and provide a clear, complete picture of important semiconductor processes.

Later chapters provide a practical, up-to-date explanation of the transsistor device, incorporating all reasonable approximations and relating device properties to physical theory.

In showing the reader how to apply these methods to actual practice, the book stresses *specific* prototype circuit uses—not just general handbook coverage. In easy-to-read language, it thoroughly explains basic quantitative concepts and shows how to apply them to transistors that appear to have a good future.

Wire and cable

"Wire and Cable Manual of Technical Information," second edition. Published by Rome Cable Corp., Rome, New York, 393 pages, illustrated, $4.50.

Revision of the manual keeps pace with technical advances and changes in wires and cables since 1947, the date of the first edition. Also reflected are changes in industry standards, regulations and practices in the last decade. Particular emphasis has been placed on the newest materials and methods in the field.

The manual is divided into eight sections: (1) wire and cable technical tables, (2) wire and power cable engineering calculations and data, (3) communication frequency

data and calculations, (4) national electrical code data, (5) properties of metals, (6) general technical information, (7) conversion tables and (8) cable installation practices. A twenty-three page alphabetical index follows.

The section on cable installation and practices is new with this edition. The detailed information covers arc-proofing, bending radii, cable installation, lightning protection, proof testing, pulling compounds, pulling tensions, splicing control cables, splicing instructions, splicing power cables, splicing telephone cables and terminating power cables.

The section entitled wire and cable technical tables now includes information on aluminum conductors as well as copper. Information on new sheath, insulation and conductor materials has been added. The section on the National Electrical Code has been brought up-to-date too with the latest code changes and new tables. The section wire and power cable engineering calculations and data is a comprehensive engineering guide to cable design, selection and operation.

Electronic design

"Electronic Designers' Handbook," by Robert W. Landee, Donovan C. Davis, and A. P. Albrecht. Published by McGraw-Hill Book Co., 327 West 41st St., New York 36, N. Y., 1200 pages, illustrated, $16.50.

Broad and comprehensive in style, this handbook provides the fundamentals and data needed in the design of all types of electronic equipment. It presents both the theoretical aspects of the subject and detailed practical design information, including technical discussions, design examples, and graphical and tabular data that may be used in design work.

The entire electronic field is covered in 23 big sections ranging from vacuum tube fundamentals and voltage and power amplifiers to such topics as computer and servomechanism techniques and waveform and network analysis.

Treatments which the authors believe to be outstanding are the sections on receivers; the extremely concise and comprehensive coverage of the design of small iron core transformers and chokes; the section on power supplies, with design data establishing the optimum number of RC or LC filter sections for a desired amount of attenuation; and the section on feedback principles, including Nyquist, Bode, and Locus of Roots methods of analysis.

Free bulletins

available to our readers

Technical characteristics of **Type RR cable installations and sheaths** are outlined in Bulletin No. RR-10, new four-page publication available from **Triangle Conduit & Cable Co., Inc.,** New Brunswick, N. J. Reasons for the growing trend among utilities and industrial firms to use this modern power and lighting cable are explained.

For additional data, ask for item B-124, using the coupon on page 87.

A complete line of **duplex-type pole-mounted transformers** is the subject of a new eight-page booklet published by **Pennsylvania Transformer Div.,** McGraw-Edison Co., Box 330, Canonsburg, Pa. "Pennsylvania Pole Star Duplex Transformers" (Catalog No. 1757) describes and illustrates design and construction details, and includes mechanical and electrical data for transformers from 20 through 100 kva, with voltage ratings from 2400 through 13,200 volts.

For additional data, ask for item B-125, using the coupon on page 87.

Light & Power Utilities Corp., 1035 Firestone Blvd., Memphis, Tenn., offers its new 150-page catalog on **fluorescent, slimline-, and rapid-start fixtures,** as well as lighting data and installation information.

For additional data, ask for item B-126, using the coupon on page 87.

A one page catalog sheet is offered by **Steber Manufacturing Co.,** Broadview, Ill., describing their new Series 4000 sports, commercial and industrial **floodlights** designed to accommodate 300 to 1500 watt incandescent lamps. These new floodlights are designed to meet NEMA specification FL-6-210, types 2, 3, 4 and 5.

For additional data, ask for item B-127, using the coupon on page 87.

A sixteen-page engineering folio presents specifications, cross-sectional construction drawings, candlepower distribution curves and coefficients of utilization for a wide line of **shielded fluorescent units.** The two-color bulletin presents this data in a clear, functional layout, to afford ease and convenience to the architect and engineer in selecting the units for various applications. Copies are available from **Gruber Brothers, Inc.,** 125 South First St., Brooklyn 11, N. Y.

For additional data, ask for item B-128, using the coupon on page 87.

Electro-Channel joists, offering an economical method of underfloor electrification, are described in a new four-page brochure of **Ceco Steel Products Corp.,** 5601 West 26th St., Chicago 50, Ill.

The new joists are essentially shortspan open-web steel joists with the conventional top chord replaced by a hollow duct that serves both as a structural member and as an underfloor electrical distribution duct. Wiring can be brought up through the floor at any point along the joist where an outlet is needed.

For additional data, ask for item B-129, using the coupon on page 87.

A four-page bulletin has been released by the **General Electric Co.,** Schenectady 5, N. Y., which gives design and application information on motors from 1½ to 125 hp, developed specifically to operate machine tools

requiring frequent stops, starts and reversals under heavy load. A special rotor and stator design reduces heat generation in the stator, resulting in longer insulation life and a greater number of permissible starts.

For additional data, ask for item B-130, using the coupon on page 87.

An eight-page illustrated booklet, titled **"Valance, Cornice and Cove Lighting,"** has been published by the **Westinghouse Lamp Division,** P. O. Box 388, Bloomfield, New Jersey. Single copies are available at 10¢ each.

General rules for the structural design and installation of valance, cornice and cove faceboards; recommended materials and finishes for faceboards; construction details in sketch form; significant dimensions—supported by sketches—for the location of wiring channel and light source; a table of light source types, sizes and dimensions are among the topics discussed.

For additional data, ask for item B-131, using the coupon on page 87.

A practical and timely **Transistor Home - Study Course** especially for electronic service technicians has just been announced by the CBS tube division and is available from **CBS-Hytron,** Danvers, Mass. Proclaimed to be an industry first, the course is designed to help the independent service-dealer take advantage of extra profits now available from servicing transistorized equipment.

The CBS Transistor Course includes ten up-to-date, intensive lessons. It covers not only simplified basic theory on how transistors work, but also many practical experiments and servicing techniques.

For additional data, ask for item B-132, using the coupon on page 87.

Stockroom browsing

(Continued from page 37)

when future needs arise."

The readily accessible stock rooms are used to advantage in case of industrial purchasing agents where they are not sure of descriptive terms of items wanted. It is easy for the counter man to say: "Just step back here and let's take a look."

Tied in with counter service and stocks are other services that pay off. If a customer wants immediate billing the counter man can provide it as he writes the order; otherwise billing is done the following day.

There is no year-end let down in stocks to reduce inventory for tax purposes at Mayer Electric Co. "We don't take a chance on throwing away profits and losing

customers to save tax dollars," Mr. Weil emphasizes.

Electric tools are stocked to keep the contractors out of hardware stores for such things through a complete one-stop service.

The twenty-five-year-old firm of Mayer Electric Company is undergoing its second major expansion in eight years and the first since the new building in a growing wholesale section at 3200 Third Ave. So., was occupied in 1949.

In addition to the expanded facilities above mentioned the new addition to building will provide space for private offices for outside salesmen when needed for conferences.

Officers in addition to Ben S. Weil, president, include Leonard J. Weil, vice-president; Charles Collat, secretary-treasurer, and E. L. Killian, Jr., sales manager.

Know the law

(Continued from page 76)

amended Section 1143 were of the opinion that it was necessary to establish an arbitrary limitation on the preparation of plans by master electricians in order to avoid what seemed to them otherwise to be a conflict between the Electrical Code and the Professional Engineers' Registration Act. * * * *The proposed change was not based on any public interest, health, welfare or safety factors. These were not, and are not, present or involved.*

"On February 28, 1957, the Commissioners adopted Order No. 57-382, amending Section 1143 of the 1951 Electrical Code, in pertinent part as follows:

"a. Plans and computations of estimated loads showing in detail the electrical system and all equipment to be installed in any building shall be submitted as part of the application for a permit when required and as provided further in this Section.

"b. Plans and computations shall be prepared and signed by a professional electrical engineer, registered in the District of Columbia, as provided in the Professional Engineers' Registration Act of September 19, 1950, Public Law 789 [64 Stat. 854], for any proposed installation in which the current carrying capacity exceeds 200 amperes or the electrical potential exceeds 240 volts between terminals or phases.

"The net result of this Order was to adopt an arbitrary cut-off point of 200 amperes, considerably less than the arbitrary cut-off point of 150 kva or 600 volts proposed by the Commissioners at the hearing of October 22, 1956.

"Section 2205 of the 1951 Electrical Code provides that: "If required by the Director of Inspection a diagram showing feeder details shall be supplied previous to installation." The Commissioners have not attempted to amend this section by requiring a professional registered electrical engineer to prepare or certify such diagrams.

"The preparation of plans and computations required by the District incidental to obtaining a permit to do electrical work by a licensed and bonded electrical contractor or master electrician does not constitute the 'practice of engineering' within the purview of Title 2, Chapter 18 of the D. C. Code.

"The defendants do not question or impugn the ability, competence or qualifications of the individual plaintiffs, and others similarly situated, to prepare the plans and computations of the original or amended Section 1143 of the Electrical Code.

"The court is satisfied that Order No. 57-382 (amending Section 1143 of the 1951 Electrical Code) is unreasonable, arbitrary and capricious; and said Order is not required under the District of Columbia Code, either by Title 1, Section 244 (giving the Commissioners discretionary powers to require bonds and license examinations for certain businesses), or by Title 2, Chapter 18 (regulating the practice of engineering). And the court further finds that said Order No. 57-382 is unduly burdensome and impractical, and imposes unnecessary inconvenience, hardship and expense, both upon the electrical trade or business as such and the consuming public, with no benefits to be derived therefrom, except the possible fees which might inure to professional registered electrical engineers."

Under the Board regulation electrical contractors would have to obtain permits from the District of Columbia government before doing any electrical work, "otherwise they are not permitted to do such work; and, if it is attempted without permit, they will be subjected to the threat of arrest, fines, and/or imprisonment. Alternatively, they must cease practicing their trade or business."

The court concluded that by enacting the laws providing for the registration of architects and professional engineers, Congress did not intend to modify or affect Section 1143 of the Electrical Code.

"Certainly the occupation of an electrician is legally recognized and involves scientific learning and knowledge for a proper understanding of such a calling. The preparation by duly licensed master electricians of plans, diagrams and computations under * * * the Electrical Code does not constitute the 'practice of engineering' as contemplated in the Professional Engineers Registration Act.

"In order to be valid, regulations of the category under consideration here must be reasonable and not arbitrary, and they must have a tendency to promote the public health, safety or general welfare. If such a regulation is unreasonable and arbitrary and bears no rela-

tionship to the public health, safety or general welfare, resulting in discrimination for no lawful reason, it is the duty of the court to invalidate such exercise of power.

"The defendants' Order under consideration bears no relationship to the factors of public health, safety or general welfare, and results in discrimination against the electrical trade or business, and inevitably increased costs to the consuming public, for no lawful reason."

Planned service

(Continued from page 42)

between supply houses is service, and having an adequate stock is an element of service that impresses the customer above all else.

Most of our customers take advantage of our thorough knowledge of materials by leaving us a blueprint of the job they are bidding on or working. We save the contractor a lot of time with this service. To illustrate, only a few days ago, in checking blueprints, we found that a change of specified light fixtures was advisable. To save the electrician's time, we contacted the architect and suggested the change, which he approved.

We find that the architect appreciates this service. Sometimes our suggestions, based on our knowledge of materials, aid him as well as the electrical contractor.

Our examination of plans for electrical construction is more thorough than that of many of our competitors. We find that the extra time we give to this service nearly always results in finding ways for the electrical contractor to do his job more economically and more efficiently. During the period we have operated, we have succeeded in winning recognition for this superior service, and the result is the confidence of our customers in our knowledge of materials.

Throughout our service program we try to impress customers with our efforts to help them to increase profits. We follow job accounts through from the beginning until the job is completed. When we can, we make personal contacts with the electrical contractor, checking with him as work progresses. If we cannot see him, we telephone. Our telephone is a busy instrument. We use it all day for selling and for keeping in touch with customers working on jobs in the area. The small contractor gets as much

attention from us as the big one whose job mounts into multiple thousands.

The result of our efforts to give helpful service shows up in repeat business. From the time we open at eight in the morning until we close, large contractors and small ones stop at our parking area, come in, and pick up materials for immediate use.

An electrical contractor who is waiting for service in the show room of his supply house is losing time. We do not let that happen in our establishment. We make sure that there are enough trained personnel on the floor to take care of everyone promptly. The city counter is a busy spot here, and a profitable one. Much of our volume goes over the counter. The customer, by taking the purchase with him, avoids the necessary delay of delivery service.

While we do have a fast delivery service, our customers prefer to park in our convenient parking area, which is close to the retail center of town, and pick up their own purchases.

It pays to let customers know their patronage is valued. Statements here are mailed with advertising pieces. We feel that an attractive stuffer takes away the slight sting that always accompanies a bill. It lets the customer know that we value his business and want a repeat.

We also maintain a live mailing list of all customers. Sending the customer a Christmas card and one or two messages through the year is another excellent way to let the electrical contractor know that we want to serve him. We are convinced that a little friendly advertising has far-reaching results.

I often repeat to myself that the main difference between supply houses is *service*. We try not to be excelled.

Limited-line policy

(Continued from page 46)

cruing from this "single-line" policy which is of indirect benefit to the customers of Florida Electric Supply is that the company enjoys the greatest cooperation from its sources of supply, since these manufacturers have long since learned that the Florida wholesaler is *their* customer, lock, stock and barrel, and not a patron following the will-o'-the-wisp of bargain hunting.

As a result, since the lines handled by Meier aren't duplicated, in many instances, a mere request to the manufacturer forestalls him from overlapping via distribution to competitive wholesalers in Meier's trading areas.

This Florida supplier's helpfulness to contractors extends in other directions also.

For instance, delivery service to some areas is a sore point with contractors. To counteract this annoyance and the expensive delays incidental to it, Florida Supply opened a branch in Jacksonville a while back, and another in Miami a few years later.

Earlier this year a third house opened its doors in St. Petersburg, thus providing the company with four stores strategically located across the state of Florida. To alleviate the poor delivery facilities afforded by commercial common carriers and their refusal to pick up from the distributor and make same day deliveries, Florida Electric now sells and warehouses their suppliers' products plus operating their own fleet of trucks, thus stepping up service to contractors.

So his salesmen may be more cognizant of electrical developments about which contractor-customers need to be alerted, a full-dress sales meeting is held every week. At this two-hour session all salesmen are in attendance as methods of selling are portrayed or films shown which bear on new products. A most unusual aspect of such training lies in this distributor's action in sending each salesman out to spend an entire week with the manufacturers to get better acquainted with the merchandise that he sells for Florida Electric.

The company foots the entire bill for the week's stay. Says Meier: "We average sending four men a year, and it pays off in their added helpfulness in solving the contractor's problems when it comes to selecting equipment for a specific installation. Again, because the trip makes our salesmen more conversant with the product, he does a better selling job while at the same time acting in the role of consultant to the busy contractor."

Another important result of these trips is that the salesmen frequently see some control or piece of equipment that his employer could sell in Florida and should be handling.

That this extra-curricular training and exposure to manufacturing

methods makes a more articulate salesman is evidenced in the fact Meier suffers a continual defection of his salesmen from his ranks. They are pounced upon by other distributors, or manufacturers' agents wean them away.

"While we're complimented that we have trained our salesmen so well they're in demand by the competition, and it is a tribute to our training, we always feel that while we hate to lose a good man, it's worse to attempt to hold on to one who is dissatisfied," said Meier. "The wholesaler is wise who lets such a man go and immediately begins training a replacement."

Meier feels that at least during the training season and for some time afterwards, an embryo salesman is his body and soul and his devotion to the firm undeviating. Meier cites numbers of cases where salesmen who sought greener pastures ventured to return to Florida Electric.

Meier is opposed to handling appliances, on the simple premise that they monopolize overmuch of the time of countermen and sales personnel.

"Such time rightfully belongs to our customer—the electrical contractor," Meier avows. "When he calls on us for emergency supplies to be handed over the counter, we have a responsibility to get them to him so he can get back on the job with a minimum waste of time."

Company President Roger Q. Austin pinpoints the phenomenal growth of his company as being predicated upon its service to its customers.

Says he: "Our salesmen and service personnel are equipped knowledge-wise to be of service to the electrical industry. Through trained people, quality products and top service, our growth will continue."

In line with this spirit of helpfulness, Florida Supply was, according to Austin: "the first wholesaler in the country to get its catalog printed up by a well-known organization in this field.

"We put out a catalog that lists every item we stock, and this is kept in current form. As we receive price information sheets from the company—correlated in mailing envelopes—all we need do is deliver them to the postoffice. This means we don't interrupt or disrupt office routine for such mailings, nor do we need any space or printing equipment, nor do we al-

lot time to this chore which could be better devoted to our customer relationships.

The company gets Trade Service Publications, Chicago, advance information on price changes; they supply line drawings of electrical devices and they include information derived from manufacturers. This information is held up only until they have five sheets to send us, in envelopes addressed to our customers via the mailing list we supply.

"This means that our customers receive almost a weekly mailing, keeping them filled in with the latest price and information material to help them in their work.

"We have about 800 of our catalogs in the hands of contractors, and, unlike some distributors who print their own, we have no investment in a printery or its equipments. We avoid the headache of obtaining competent people to operate such a department.

"Our source of supply are professionals who can do such a chore far better than a wholesaler can because they're experts in the specialized printing field.

"And we can use the time and investment better in prosecuting the sole aim of our existence-wholesaling."

Austin points out that his contract with the printing and information service company is elastic in that it can be terminated at will by Florida Electric.

Construction budgets

(Continued from page 66)

gan during 1957, and major construction work on both of these plants is expected to begin in early 1958.

During the year, several groups of electric utility companies undertook nuclear power development work. In February 11 companies serving in the North-Central area of the United States formed the Central Utilities Atomic Power Associates. This group is undertaking the development and construction of a 66,000-kw reactor scheduled for completion in 1962. A contract with the Atomic Energy Commission to carry out the project under the third round of the AEC Power Demonstration Reactor Program was recently signed.

Also in February, 12 electric utility companies serving the Ohio Valley and contiguous areas formed the East Central Nuclear

group. This group plans to undertake a program of nuclear reactor research and development which it believes will represent a significant advance in the technology and economics of utilizing nuclear fuel to produce commercial electric power.

In mid-1957 fifteen utilities serving Arkansas, Louisiana, Mississippi, Kansas, Missouri and Oklahoma, announced formation of the Southwest Atomic Energy Associates. This group has as its purpose to carry out a major research and development program aimed at practical use of atomic energy as a supplemental fuel for the future electrical needs of the states in which they serve.

In April of 1957 eleven Texas utility companies announced the formation of the Texas Atomic Energy Research Foundation. This group subsequently joined with General Atomic Division of General Dynamics Corporation in sponsoring a four-year, $10 million research program in the field of thermonuclear reactions.

Also during 1957 the San Diego Gas and Electric Company joined with General Atomic Division of General Dynamics Corporation in undertaking nuclear power research work, and the Rockland Light and Power Company formed a group with several manufacturing firms to carry out nuclear power investigations.

All told, electric utility companies are now engaged in a substantial effort aimed at bringing about the development of economic nuclear power at the earliest practicable time. While the technological challenges are indeed formidable, electric power companies, both individually and in groups, have continued to demonstrate their eagerness and competence to do their part in overcoming these challenges.

Distribution talks

(Continued from page 62)

the way we engineer distribution systems offer promising possibilities.

"Second, dramatic developments in computers make it possible to analyze situations which were hopelessly complex, or uneconomical, a short time ago. Programming has been a big bottleneck limiting full-scale computer use. Automatic techniques are making it possible for this job to be handled by system design engineers.

"Third, applications of powerful computers to system planning are on the horizon. A start has been made and several promising possibilities for additional work are under study. An illustrative example and a practical case were cited to demonstrate that computers can be utilized as a new approach to system engineering.

"Fourth, most utilities have the required talent in their present engineering departments to exploit these modern techniques. What is needed is the initiative to get started. A little training for flexible young engineers and access to a computer are all that is required to start making applications.

"As we search for new applications—new problems to solve—let us not be discouraged if each new proposition seems more complex than the one before. The most exciting and rewarding work remains to be done. We have scarcely scratched the surface of what we can do in harnessing powerful computers to improve our distribution systems."

The final day of the conference included a symposium on silicone insulation featuring presentations by John Dexter, of Dow Corning Corp., M. L. Manning, of Pennsylvania Transformer Co.; and N. D. Kenney, Simplex Wire and Cable Co.

The conference ended with a panel discussion on time-saving devices and techniques applicable to distribution systems. Harold Tynan, manager of Electric Department, City Public Service Board, San Antonio, served as chairman and moderator. Discussions were presented by: Overhead, R. M. Jolly, City Public Service Board; Underground, John A. Campbell, Houston Lighting and Power Co.; Substations, Gerson Berman, Texas Power and Light Co.; Meters and Services, Floyd Salmon, Central Power and Light Co.

Collective management

(Continued from page 40)

dium decisions will be rendered when perhaps two or three members of the presidium will discuss

phases of the business that do not require participation of the full presidium. It is usually in cases where serious matters are considered that full presidium management meetings are required.

It may be interesting to note that four members of the presidium are brothers. They are of varied educational backgrounds.

Alex Meletio, Jr., is a graduate attorney and a member of the bar. Jack Meletio is a graduate accountant. George Meletio majored in business administration, and my qualifications are those of a graduate electrical engineer.

This varied educational background of the presidium has proved to be extremely advantageous in this type of management, particularly with the rapidly changing economic and technical trends incumbent upon business today.

Many people have asked: "How can four brothers work together in a single business and still get along?"

The secret is for each brother to treat his brothers with the same courtesies that would be extended to any other person.

Fire alarms

(Continued from page 50)

Maintenance consists of frequent checks on the system, so that it operates efficiently when needed.

Cheeks finds the service profitable in itself, as a sideline to his electrical contracting business. He also values it as a means of attracting attention to the electrical maintenance service he gives to industrial and commercial customers.

In this growing industrial area of northeastern Louisiana, his burglary, holdup and fire alarm service has a bright future assured with the maintenance he gives with the aid of his "alarm jeep."

Contractor consultation

(Continued from page 33)

lighting is due to lack of knowledge of contractors and designers in the past.

There is good money in lighting; much of this potential is being neglected, and the costs are relatively easy to figure for one who understands it—so there isn't much of a gamble on profits. But many contractors do not know enough about it to talk and sell

lighting intelligently. That's one reason it is often neglected, which completes the "cycle." Here opportunity knocks, according to competent trade sources.

Biggest needs are knowledge of the best types of fixtures and accurate appraisals of the right type and amount of lighting to meet specific conditions. This often boils down to the right *number* of fixtures — for selling the consumer either too much or too little lighting leaves him dissatisfied.

It is believed that in the whole field of *outdoor* lighting of substantial homes, gardens and swimming pools, merely the "surface" of possibilities has been "scratched." Jobber and factory-agent training of contractors is badly needed here, and Allied expects to do more of this work, as Fred Segal's technical training was in lighting and electronics. The possibilities of the latter field in machinery controls are also unlimited for the firms who get factory training.

There are many contractors who would like to see factory experts explain electric motor starters in detail—take them apart and show how they work. Demonstrations in this field would be popular and good for the installer's self confidence.

Special order problems

Another problem which comes up occasionally is that of getting special equipment which takes 90 days on order—like special oil-fuse cutouts. These and other items can sometimes be put on order and then "borrowed" from the power company or other suppliers to be "repaid" later when delivered. This stunt sometimes avoids holding up a job.

Jobbers who specialize in new and improved *tools* also have a fertile field as these really do cut job costs. Recent examples are: a new Jet-Line gun which employs an explosive cartridge to propel a 20-lb-test nylon line through 1- to 4-inch conduit for distances up to 400 ft.; a condumatic bender, motor-driven to make 90-degree bends in small conduit in a few seconds. Many other tools can be sold if actively promoted on a profit-building basis.

While rendering many special and advisory services, Allied never forgets that fast delivery of materials is still the contractor's biggest need, day-in and day-out. With labor at 6 cents a minute, any dislocation of a job through delay of material is the most serious failure that a jobber can be guilty of. In this operation too, they feel that continuous personal attention is the chief factor. They press for full information on every order, make out full lists of materials and follow them up, also checking frequently with the factories to assure delivery dates. They make up their own delivery schedules and check them regularly, visit each sizable job to familiarize themselves with the problems and bottlenecks, and keep in close touch till the work is completed.

Estimating inquiries

Like most wholesalers the Segals have a separate set-up to take care of estimating inquiries, and they get this information out rapidly and accurately, using all their contacts to supply the best items for the particular job, and looking ahead from their broad experience for any possible booby traps. They recommend favorably-priced items, including bargain leaders when costs are a critical factor, and also selected equipment easiest to install because of design.

If a contractor is very busy, or needs help very badly on some unfamiliar work, this jobber will make him a complete "breakdown" list of all material needed for an emergency job—but without any guarantee to supply for a fixed price items which might be omitted through oversight. This service costs money and is only designed to get a contractor out of an occasional "tight spot." *It is not a routine practice or one to be abused.*

All invoices for material are priced and mailed the same day or early the next, and the firm has recently added new machines to speed up billing more efficiently.

A practice which helps both jobber and contractor is the use of manufacturers' sales booklets as stuffers in all bills and letters sent out to the trade. These compact brochures act as miniature catalogues complete with pictures and prices of many items, and contractors use them in sales work keeping an assortment on hand for ready reference. They really bring in business.

On inventory control, Allied does not find it necessary to use an involved paper system, but the

No. 1 in a series

Right off the Wire

An all-electronic telephone exchange (said to be the first for commercial use) has no moving parts, is noiseless and can be used in explosive atmospheres. It includes a "memory" which will hold an incoming call.

Wire can be strung beside a railroad track by a new travelling crane at the rate of 60,000 feet per hour.

Simplex recently completed one of the largest and heaviest shipments of cable ever transported on one reel — nearly two miles of ANHYDREX XX insulated submarine cable weighing 60 tons.

A new rubber-like material is porous, but will contain liquids.

Boron, lithium, hydrogen peroxide and fluorine compounds are to be the fuels of a new bomber reported to be in the design stage.

Smog-causing chemicals from automobile exhausts can be eliminated by a chemical catalyst developed by an automobile manufacturer.

Improvements in the explosive rivet have made it noiseless.

Only the touch of a hand is needed to light a new lamp. The electricity in the hand does the work.

Thorium is about three times as plentiful as uranium. A new process for the production of reactor-grade thorium should lead to a reduction in the cost of atomic fuel.

A high-output ultraviolet lamp, for heating and air-conditioning ducts, is claimed to be 1,000 times more effective in killing viruses and bacteria than an equal amount of radiation from the sun.

The world's largest solar furnace is to be completed in 1959. It will produce temperatures as high as 8,000°F, which is about 70% of the temperature of the sun's surface.

An ultra-hard glass has been developed that retains its hardness up to 1508°F.

The cost of converting sea water to fresh water has been reduced from $1.50 to 60 cents per thousand gallons.

"Talk-back TV", a new advance in educational television, enables a pupil to ask questions of a teacher who is broadcasting from a distant room.

Scientists have been able to produce shock waves with speeds of more than 100,000 mph (above Mach 150) involving temperatures higher than 100,000°F.

Some 1958 automobiles are using aluminum instead of copper in battery cables.

The first deep sea telephone cables to utilize the revolutionary new Bell Laboratory vacuum tube repeaters were manufactured by Simplex. Minimum tube life is expected to be 20 years.

Danish trawlers are using nylon propellers. The four-foot, three-bladed size weighs only seventeen pounds and they reduce vibration, resist impact damage and corrosion.

A cell that generates electricity by the chemical action of oxygen and hydrogen has been announced. It avoids some of the disadvantages of both dry cells and storage batteries.

An airplane has been built which can change its shape while in flight for the purpose of testing aerodynamic configurations.

C-L-X (Sealex) is the name of a new, completely sealed, corrugated metallic cable sheath manufactured by Simplex. It is pliable, moistureproof, and permits cable engineers to select the most economical cable cores, while assuring the greatest mechanical protection available.

Observations of the aurora during the Geophysical Year show that it occurs simultaneously at both the North and South Poles. This definitely identifies it with the earth's magnetic field.

A miniature battery about the size of a paper clip is said to deliver a steady flow of current for 176,000 hours.

Shirtsleeve Service

Simplex recently completed an order for 4600 ft. of Anhydrex XX Parkway Cable. The Simplex man was on the spot to help with installation, which happened to be on a 9,500 ft. mountain in rough terrain. He helped design a reel mounting bracket (for holding up to 7200 lbs.) for the front of the tractor used for laying. He supervised the laying of two lengths 2200 feet long.

This case typifies the kind of cooperation that Simplex offers in order to assure correct installation and satisfactory service.

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Simplex

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stock is checked daily during every work lull and re-orders listed. They also have most of their stock arranged in long aisles facing the counter department so that contractors can walk down the rows and help select their own items if desired. Seeing the associated and "grouped" items helps some to think and remember what they need.

In the new building of about 10,000 sq. ft. of space which the Segals expect to erect within a year, the even broader stock will be completely coordinated and departmentalized in *open display* like an electrical super-market—so that either warehousemen or contractors can "shop" for goods quicker and easier. There will also be effective displays of slim-line and other fixtures and all items with which the trade needs to be familiarized.

Credit policies

(Continued from page 29)

for credit to the wholesaler.

"It is primarily due to these situations that the jobber is rapidly earning the reputation of being a financier.

"Take a contractor with assets of $50 to $60,000 doing a $300,000 job with a retainer of 15 per cent. The wholesaler is holding the financial bag by supplying the material, but it is the wholesaler who is unfair to his customer when he lets himself get involved in such a situation.

"The contractor cited above should have a sufficient profit so that the retainer won't endanger his financial situation. For instance, the expected profit on the $300,000 contract may be $30,000. In the meantime, payrolls, insurance, etc., have to be met. Since the contractor hasn't the financial ability to carry the job, his alliance with and reliance upon the jobber sees the wholesaler sharing the financial burden until the job is completed and paid for. The contractor needs to have such a profit out of the job as will lessen the strain on the retainer, since if anything happens to draw the job out too long, both the contractor and his jobber-benefactor may lose out, since the added time involves higher labor costs than was estimated for originally."

While it is Raybro's practice to make no carrying charge to the contractor, nevertheless the company requires bills to be discounted, and in this respect Hollis

feels an urgent need for contractor education in the basic facts of business finance.

"We showed a contractor that had he borrowed some bank money to discount his bills, he'd have saved thousands of dollars. In one instance a contractor who had neglected to take his trade discounts had it proven to him he'd lost $2,223. Yet by borrowing $6,000 at a bank, at an interest charge of $360, he would have made a substantial saving."

While it is true that banks are wary of extending financial help on the type of collateral some electrical contractors can offer, it is equally true that some wholesalers are willing to take the risk —thus usurping the banker's functions.

In the case of Raybro, which operates half a dozen stores across the face of Florida, this Tampa distributor claims: "We turn down lots of jobs because we feel it isn't fair to the contractor for us to back him up when it is obvious he hasn't the financial or organizational stability or background to handle a sizable job which may be out of all proportion to his normal pattern of wiring."

A survey of some contractors' shops reveals an amazing lack of understanding of the facts of business life. For example, Hollis stresses the fact the greatest sphere of helpfulness his firm accords contractors is in their fully-stocked warehouses in which Raybro holds for instant delivery about all the material a contractor is likely to require. Raybro even stocks such convenience items which some jobbers expect the contractor to obtain from hardware stores. In this category falls merchandise like wood screws, lead anchors, bits for electric drills, etc.

Yet inspection of the shops of some of the lads who are short of cash shows that instead of relying on the wholesaler to carry their stocks—they're trying to do it! Their fluid capital is tied up in EMT, conduit, wire, cable and a host of wiring materials capable of stocking a small warehouse. The natural question to ask then is: "Why make a warehouse out of a service organization? Why not let the jobber carry the investment, especially since he stands ready, willing and able to supply fast delivery?"

Experts operating in an advisory capacity to Florida contractors point out that actually, the contractor who carries the most stock is expressing the poorest judgment; "That stuff," they avow," should be in the wholesaler's warehouse. The telephone is the instrument to use when stock is required."

Furthermore, just as the wholesaler should stay out of the financial business—so should the contractor stay in the contracting business and get out of warehousing. Thus he will be in better financial shape and better able to swing the next big contract he lands!

In other aspects of helpfulness to contractors, Hollis points out that Raybro numbers among its personnel experts in about every field of wiring and they're ready to travel many miles to be of assistance in planning and pricing special power or lighting installations for the contractor stymied by vaguely-worded specifications.

These engineers are available for planning commercial jobs from a football field or a school to a

factory or multi-storied building and their services are rendered for free. Raybro's specialists will work with the contractor, the architect and engineers on the job and are highly qualified in their work which may involve interpretations of blueprints which list only lighting outlets and ask the contractor to bid on the kind of lighting the job requires.

Since this may involve general lighting for a super market or spots for a jewelry store, it is obvious that the help extended by Raybro can be of inestimable value to the contract-seeking contractor.

Raybro guides its customers when specifications call for an "equivalent" fixture or control; the contractor is supplied with a complete report price, all ready to submit to his customer.

It must be obvious that despite all this, work on the part of Raybro to help its contractors may be for naught should the contractor lose out on the job. Nevertheless, comparable aid is always on tap for the next job or the next contractor.

"For example," says Hollis, "where a sizable job is in view, we anticipate the fixtures by examining the plans on file in our Builders' Exchange. We list off the two things that confound contractors—the fixtures and panels, so when a contractor readying to bid the job arrives, we can give him the prices without delay.

"We make available a room in our new building for contractors; we print bulletins of contractors' meetings, we hold meetings with them (the last meeting saw forty contractors in attendance), and we send out notices of code changes.

"But there exists a crying need for the wholesaler to help his partner, the contractor, in educating him to the value and significance of building up a credit reserve based upon the magnitude of his own operation."

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Code questions

(Continued from page 54)

equipment grounding for those wishing to do so, and many do from force of habit or because they think it proper as it is on full ranges. But it is a poor practice. Many inspectors have reported in convention that such practices have been the source of much trouble. Separate equipment grounding conductors, either bare or having a green outer covering, should be run in the same raceway or cable assembly as the current-carrying conductors and attached to the frames of all such appliances. The raceway, itself, of course, may be used for this purpose if continuous and properly grounded.

Answers: to ten test questions (1. **False** sec. 1116-b) (2. **False** sec. 1108) (3. **True** sec. 1118) (4. **True** sec. 1119) (5. **False** sec. 1111) (6. **b** sec. 2005-d) (7. **b** sec. 2006-b) (8. **c** sec. 2103) (9. **a** sec. 2112) (10. **c** sec. 2112)

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ADVERTISER'S INDEX

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PLEASE BEAR WITH US THIS MONTH! *In the event that we omit some Manufacturers' Agents or fail to list all lines handled, it is because we have not had quite enough time to bring ELECTRICAL SOUTH records completely up to date with the listings furnished us for our 1958 ELECTRICAL SOUTH Directory.*

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I-T-E Circuit Breaker Co.

TENNESSEE

Chattanooga

Craig-Owen
Light & Power Utilities Corp.

Knoxville

Bowditch & Co.
Delta Star Elec. Div.

Pettyjohn Co., John G.
Kuhlman Elec. Co.

Turbyville, Chas. B.
King Mfg. Co.

Williams, R. T.
Atlantic Conduit Fittings Co.

Memphis

Fitts, Lloyd D.
B & C Metal Stamping Co.
Gedney Elec. Co.

Gregory-Salisbury & Co.
I-T-E Circuit Breaker Co.
Revere Elec. Mfg. Co.

Southland Sales Agents
Jasper Blackburn Corp.
Fanner Mfg. Co.
J. A. Weaver Co.

Stout & Co., Curtis H.
Burndy Corp.
Steber Mfg. Co.

Thomas, Ross D.
Multi Elec. Mfg. Co., Inc.

Torkell, E. E.
Kuhlman Elec. Co.

Nashville

Fowler Factory Sales Agency
Prescolite Mfg. Corp.
Revere Elec. Mfg. Co.

Hopper & McCoy
All Steel Equip., Inc.

Matthews, Jim
Tomic Sales & Eng. Co.

Southland Sales Agents
Jasper Blackburn Corp.
Fanner Mfg. Co.
J. A. Weaver Co.

TEXAS

Amarillo

Butler & Land
I-T-E Circuit Breaker Co.

Bellaire

Sinclair, Joe
Wadsworth Elec. Mfg. Co.

Dallas

Anderson Co., Geo. E.
Collyer Insulated Wire Co.
Monarch Elec. Corp.

Burrus & Matthews
J. A. Weaver Co.

Butler & Land
I-T-E Circuit Breaker Co.

Cook, Bill
Multi Elec. Mfg. Co., Inc.

Cope & Co., I. E.
Delta Star Elec. Div.

Crockett-Lund Co.
Cornish Wire Co.

Fain Assoc.
A. H. Massey, Inc.

Galvin Sales Co.
Ideal Industries, Inc.
Spang-Chalfant Div.

Glidden Eng. & Equip. Co.
Sorgel Elec. Co.

Gunn, Clarence A.
Whitney Blake Co.

Hancock Co., John L.
Prescolite Mfg. Corp.

Harrison & Co., Tom
Circle F. Mfg. Co.

Hodges Co.
Berns Air King Corp.

Ivy & Co.
Berns Mfg. Co.

Martin Co., J. D.
Tomic Sales & Eng. Co.
Union Insulating Co.

McAdams Co., W. H.
Fasco Industries, Inc.

Miller Co., Harry A.
B & C Metal Stamping Co.

Morgan Co., Jack
Gedney Elec. Co.
Plymouth Rubber Co.
Steber Mfg. Co.
Wadsworth Elec. Mfg. Co., Inc.

Musgrove Co., Curtis
Jasper Blackburn Corp.
Kuhlman Elec. Co.

Nuro Co.
Paine Co.
Royal Elec. Corp.

Peabody Bros.
American Metal Moulding Co.

Randall Co., Jim
All Steel Equip., Inc.

Robertson, Inc., Elgin B.
Burndy Corp.
Preformed Line Prods. Co.

Robertson & Co., Jim
Bridgeport Fittings, Inc.
Fullman Mfg. Co.

Snoots, Wynne
Revere Elec. Mfg. Co.

Very, Milton C.
Fluorescent Fixtures of Calif.

Ward Co., L. R.
Fanner Mfg. Co.

Watson, Felix M.
Arro Expansion Bolt Co.

White, Robert F.
Vulcan Elec. Co.

Wilber, R. B.
H. B. Sherman Mfg. Co.

El Paso

Adams, Fred H.
Tomic Sales & Eng. Co.

Associated Engineers
Delta Star Elec. Div.

Electrical Engr. & Sales Corp.
Dossert Mfg. Corp.

Elmore & Co., Marshall R.
Circle F Mfg. Co.

McCain, J. E.
Helwig Co.

Ft. Worth

Musgrove Co., Curtis
Jasper Blackburn Corp.
Kuhlman Elec. Co.

Greggton

Neal Assoc., Inc., Martin
Southern Lighting Mfg. Co.

Houston

Brenner Elec. Sales
Elliott Elec. Prods. Co.
M. Stephens Mfg. Co., Inc.

Burrus & Matthews
J. A. Weaver Co.

Carroll, John
A. H. Massey, Inc.

Clinton, Walter L.
Buchanan Elec. Prods. Co.
Edwin F. Guth Co.

Cope & Co., I. E.
Delta Star Elec. Div.

Glidden Eng. & Equip. Co.
Fluorescent Fixtures of Calif.
Sorgel Elec. Co.

McCray, W. S.
Helwig Co.

Musgrove Co., Curtis C.
Jasper Blackburn Corp.
Kuhlman Elec. Co.

Nuro Co.
Paine Co.
Royal Elec. Corp.

Peabody Bros.
American Metal Moulding Co.

Randall Co., Jim
All Steel Equip., Inc.

Robertson Co., Elgin B.
Burndy Corp.
Preformed Line Prods. Co.

Robertson & Co., Jim
Bridgeport Fittings, Inc.

Snoots Co., Wynne
Revere Elec. Mfg. Co.

Southwestern Mfg. Co.
Vulcan Elec. Co.

Traweek-Healy & Assoc.
Multi Elec. Mfg. Co., Inc.

Very, Milton C.
Fluorescent Fixtures of Calif.

Ward Co., L. R.
Anderson Elec. Corp.
Fanner Mfg. Co.

Wilson Elec. Equip. Co.
Bulldog Elec. Prods. Co.

Lubbock

Snoots Co., Wynne
Revere Elec. Mfg. Co.

Waco

Musgrove Co., Curtis C.
Jasper Blackburn Corp.
Kuhlman Elec. Co.

VIRGINIA

Arlington

Russell, Charles
Royal Elec. Corp.

McLean

Dunlop Lighting
Revere Elec. Mfg. Co.

Norfolk

Bristol Co., W. A.
Sorgel Elec. Co.

Richmond

Ferguson, Lynn W.
Gedney Elec. Co.
Wheeler Reflector Co.

Fishburne, Robert W.
B & C Metal Stamping Co.
Spang-Chalfant Div.

Lassister Sales Co., W. H.
Atlantic Conduit Fittings Co.
King Mfg. Co.
Prescolite Mfg. Corp.

Mayo, Jr., Paul
Blackhawk Industries

Roach, Leo A.
All Steel Equipment, Inc.
Jasper Blackburn Corp.
Steber Mfg. Co.

Rumsey Elec. Co.
Delta Star Elec. Div.

Simpson & Son, Paul
Dossert Mfg. Corp.
Ideal Industries, Inc.

Sullivan, William J.
Circle F Mfg. Co.

Turner, Harris
Edwin F. Guth Co.

Roanoke

Kraft, Ray
Marcus Transformer Co., Inc.

Rumsey Elec. Co.
Delta Star Elec. Div.

Warwick

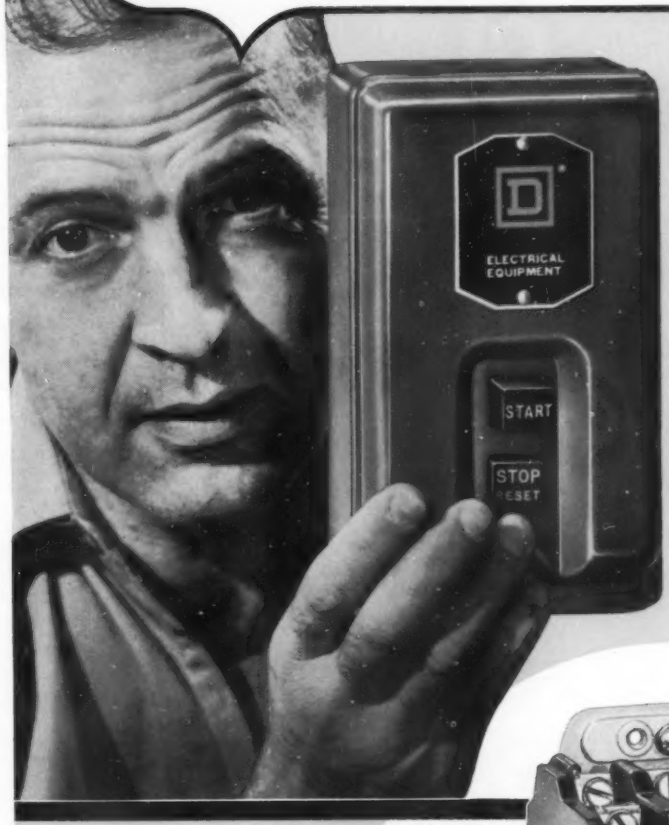
Johnson, S. C.
Elliott Elec. Prods. Co.

WEST VIRGINIA

Huntington

Muller, Harper & Assoc.
Burndy Corp.

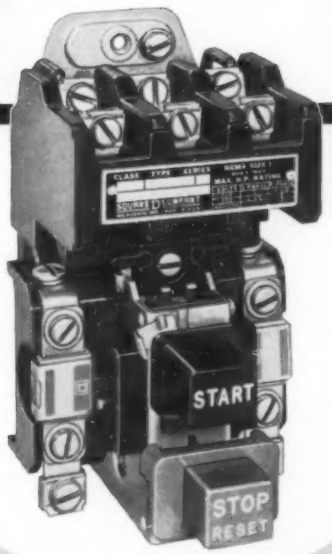
This NEW Manual Starter has EVERYTHING!



NEMA Sizes 0 and 1

Two, three and four-pole construction

- ***SMALLER!*** Takes less space, whether it's built into machine or mounted externally
- ***SMART STYLING!*** Matches the streamlined appearance of today's modern machines
- ***QWIK-MAKE, QWIK-BREAK!*** Positive snap-action opening and closing of contacts. Longer contact life
- ***TRIP-FREE OVERLOAD PROTECTION!*** Impossible for operator to hold motor circuit closed against overload
- ***LONGER LIFE!*** *Toggle Action* operating mechanism. Heavy-duty construction throughout
- ***EASIER INSTALLATION!*** Wire it without removing starter from enclosure. All terminals have pressure wire connectors
- ***EASIER MAINTENANCE!*** "Off-the-Shelf" parts kits make normal maintenance and modifications easier than ever. They're easy to buy, easy to identify, and faster to install
- ***TAMPER-PROOF!*** Cover padlocking device prevents tampering by unauthorized personnel. Safety latch locks "start" button in "OFF" position
- ***VISIBLE INDICATION OF OVERLOAD!*** Self-centering push-buttons show when overload has occurred



CHOICE OF ENCLOSURES:

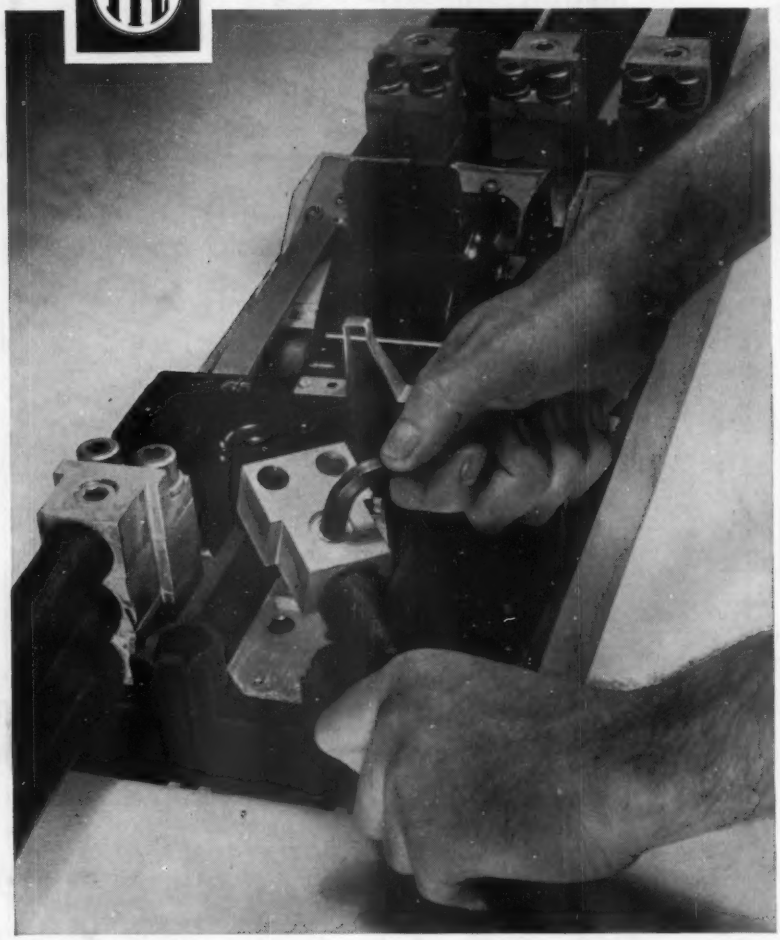
- Water and Dust-Tight
- Hazardous Locations
- Flush Mounting

Write **for BULLETIN 2510 B-C**
Address Square D Company, 4041 North Richards Street, Milwaukee 12, Wisconsin

EC&M HEAVY INDUSTRY ELECTRICAL EQUIPMENT...NOW A PART OF THE SQUARE D LINE

SQUARE D COMPANY

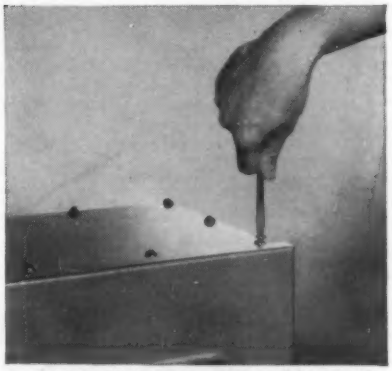
MOLDED CASE CIRCUIT BREAKERS



These individual cable lugs, each with an Allen head locking bolt, make connection of cables far easier and provide a much sturdier, neater assembly. An exclusive on all I-T-E 800 ampere breakers. UL approved for service entrance equipment.

I-T-E enclosures are side-hinged—no need to remove, or prop up, the cover. It is nevertheless easily removed, the hinge being of the pin-and-socket type—lifts off and on readily.

Field checks indicated that the addition of a supporting bracket would be a big help in installing larger breakers, and this feature is now added on all large-size enclosures.



To facilitate drilling holes of the desired size and position, end-plates of larger enclosures can be unscrewed and removed. Drill to your exact conduit needs.

SEVERAL EXCLUSIVE I-T-E FEATURES COMBINE TO SAVE YOU MONEY WHEN INSTALLING CIRCUIT BREAKER EQUIPMENT

In designing molded case circuit breakers for higher capacities, for example, I-T-E design engineers recognized that the difficulties inherent in making large multiple cable connections had to be considered. Pictured above is their solution—"stacked" lugs for time-saving installation. No need to fight clumsy, unyielding cables.

I-T-E enclosures, too, have exclusive, built-in features which greatly facilitate installation of circuit breaker equipment—saving additional installation time. And since time is certainly money these days, consider the time-saving features pictured here and you'll see how I-T-E can save you money even before your I-T-E breakers are in service!

SMALL AIR CIRCUIT BREAKER DIVISION

I-T-E CIRCUIT BREAKER COMPANY

19TH AND HAMILTON STREETS. PHILADELPHIA 30. PENNSYLVANIA